ART

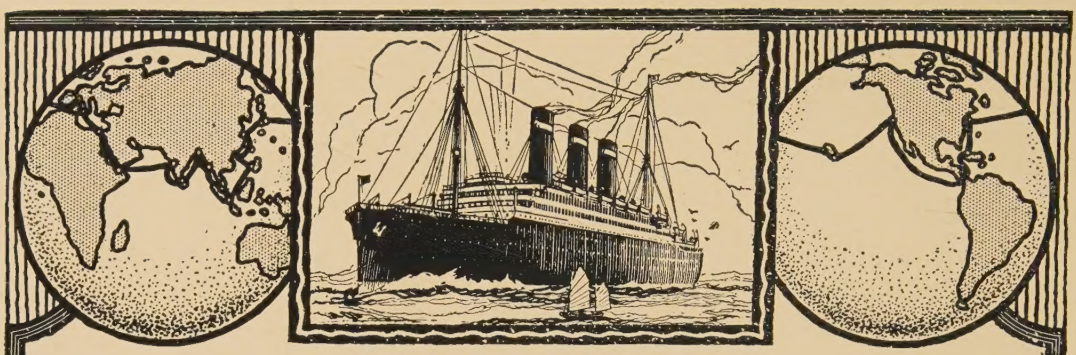
The MENTOR

THIRTY-FIVE CENTS A COPY

AUGUST 1924

MID-SUMMER OUTDOOR NUMBER

HUMAN TRAITS OF BIRDS—ART OF THOMAS MORAN REPRODUCED IN GRAVURE PRINTS



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—What bird walks on the water?
—What flowers build death traps?
—What birds prepare a great feast to thank the flowers?
—What plant makes soup of its guests?
—How to tell a toadstool from a mushroom?
—What trees walk to be nearer the water?
—Why some flowers smell sweeter in the evening?

Do You Know

—How the heavy seeds of the wild blackberry are carried to seemingly inaccessible places?
—What the common names of the butterflies are?
—Why a tree will die if only the bark is circled with a deep cut?
—Where the butterflies go in winter?
—How to recognize the birds of the field, shore and marshes?
—How butterflies elude capture, what tricks they employ to feign death?
—Which insect is known as the Caterpillar Hunter?

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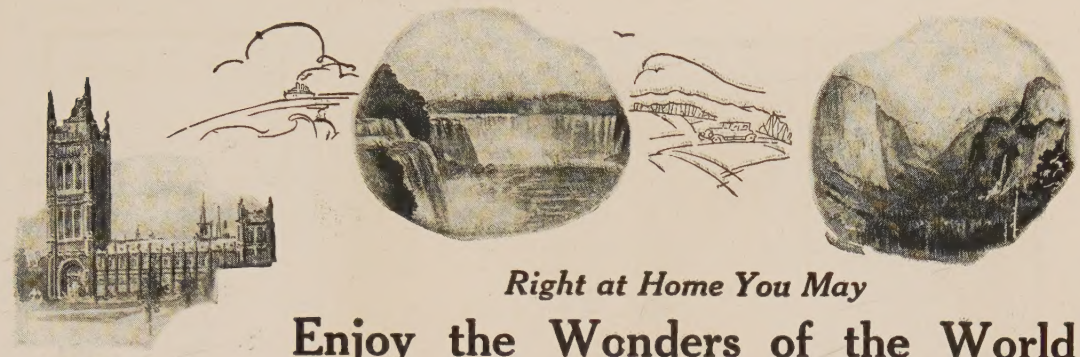

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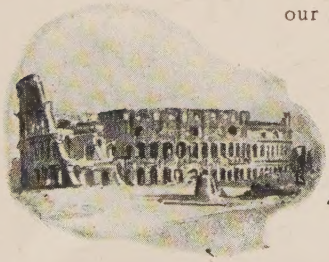

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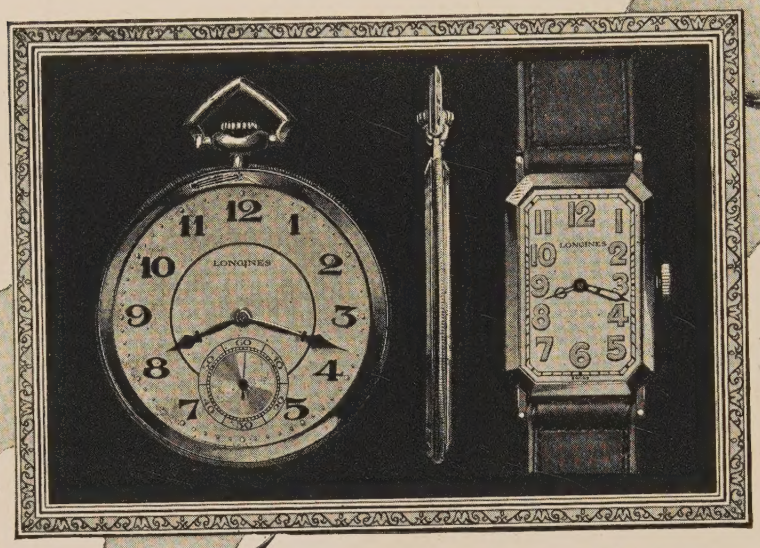

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HUMAN TRAITS OF BIRDS

BY LEE S. CRANDALL

CURATOR OF BIRDS, NEW YORK ZOÖLOGICAL PARK

Photograph by Mary C. Dickerson Courtesy American Museum of Natural History

TREE SPARROW

BIRDS *are so like human beings in some of their habits that a close observation of bird life gives us a fuller and livelier appreciation of human nature. We can see much of ourselves reflected in the bird world—our own characteristics and ways of living—and we find our feathered friends doing many things better than we do. Mr. Crandall shows us how human they are in many ways.*

Photograph by Elwin R. Sanborn

FATHER EMU ✣ ✣ MOTHERS THE BROOD

Among the Australian emus the female does the courting. Once mated she evades as far as possible all maternal and wifely cares. She builds no nest and lays her large green eggs wherever she happens to be. Close at her heels runs her hen-pecked mate, who gathers the scattered eggs and then sits on them for eight tedious weeks. When the little ones emerge from the shell the father painstakingly plays nurse to the downy striped flock, whose mother by this time is roaming the country looking for another mate

THE MENTOR

Vol. 12 No. 7 ✣ AUGUST, 1924 ✣ Serial No. 258

THE HUMAN TRAITS OF BIRDS

By

LEE S. CRANDALL

CURATOR OF BIRDS

NEW YORK ZOÖLOGICAL PARK

CLOTHES MAKE THE MAN—
THE TAIL MAKES THE LYRE BIRD

When displaying for courtship purposes, the Australian lyre bird raises and spreads his beautifully shaped tail so that it may be seen to the best advantage

Most of the qualities common to human beings are found in the natures of birds—love, jealousy, vanity, fear, courage, cowardice, sociability, playfulness, gluttony, devotion to nest and offspring—in fact, very nearly the full gamut of emotions.

In considering the facts, sentimentalists have been led to credit birds with almost human intelligence and æsthetic sense. Others would have us believe that birds are purely mechanical and instinctive in their actions and reactions. But those who perceive the greath truth that all life on earth, from diatoms to men, is controlled by the same all-powerful forces of nature, will take a middle course. Man has outstripped his rivals in mental development, but his attributes can be traced, in diminishing force, far downward in the scale of life. In many points of comparison, aside from the disputed one of ability to reason, birds can hold their own—sometimes, a little more.

LOVE AND COURTSHIP

If self-preservation is the first law of nature, reproduction is the second. Because of its vital urge it is directly responsible for the development of many interesting manifestations in bird life. Courtship among birds is direct and to the point. Its object is the securing of a mate and to it the bird bends every effort. There are no halfway measures, no long engagements, no postponements.

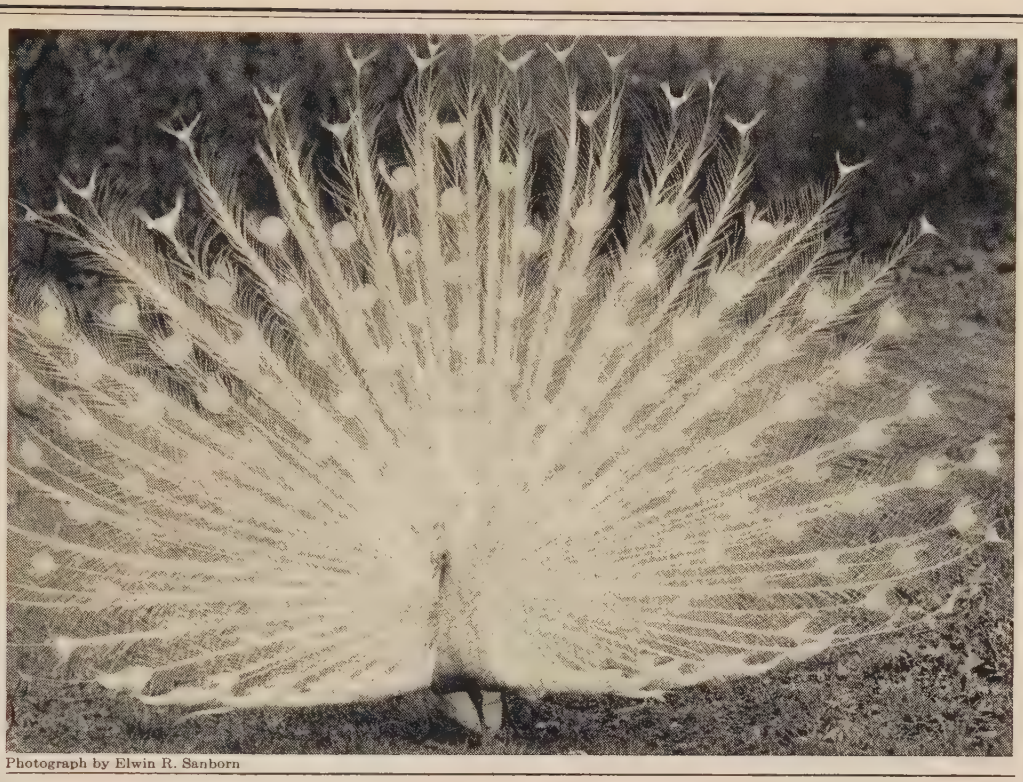
The breeding season is short and each adult individual, both male and female, is intent on securing a mate and rearing a family. In most species the chief burdens of courtship devolve upon the male. The female usually is quiet and demure. Competition among the males for her favors is often exceedingly keen, and no doubt this has given rise to much of the wonderful variety of decorative plumes and brilliant colors found in the males of many species. Song, and what passes for song amongst some birds, takes an active part, with intricate plumage displays, graceful dances, and fiercely fought battles.

With the great majority of land birds, which nest in single pairs, territory plays a most important part. Just as a man must have a home and visible means of support before he can properly marry, so must the bobolink, grosbeak, or thrush guarantee protection and food before he secures a mate. Almost invariably, when the birds return in the spring from their southern migration, we find the first arrivals are males only. In late April or early May, flocks of cock bobolinks can be found in suitable fields, living and feeding together in perfect amity. Toward the middle of the month we will find the birds widely scattered and a babel of sound greets the ear. A little observation will show that each bird holds sway over a section of the meadow and that any intrusion by a rival is met with instant attack. The proud possessor has a favorite perch, perhaps a bush or a tall weed, from which he pours forth his melody, often scaling into the air on stiffened wings, his throat bursting and the white feathers of his back spread to the utmost. The object is obvious: he is advertising to the newly arrived females of the species that he is the owner of a fine suburban plot, with assurance of all the

Courtesy American Museum of Natural History

A NESTING COLONY OF AMERICAN FLAMINGOS

The brilliantly colored flamingo has a strongly developed social instinct. Great cities, numbering thousands of nests, are formed. The seeming incongruity of the long, slender legs and equally long, swan-like neck is explained by the feeding habits. The bird wades in the water, sifting through the specially adapted beak the tiny organisms it stirs up from the bottom. Formerly it was supposed that the tall nest of mud was constructed so that the sitting bird might have room to dangle its legs. It is now known that the legs are folded over the nest in a normal position, the structure really being fashioned as a protection against high water



Photograph by Elwin R. Sanborn

VANITY PERSONIFIED

A picture of a white peacock that illustrates the wisdom of the saying "Vanity is never at its full growth till it spreads into affectation, and then it is complete." Pope declared, "Every man has just as much vanity as he wants understanding." The peacock's head is very small

necessities and even the luxuries of bobolink life, and that, if desired, he is prepared to erect an attractive one-room bungalow. He also informs other home-hunting males that this particular territory is occupied and that claim-jumpers will be dealt with severely.

A female presently approaches the territory of the well-advertised marriageable male and, if pleased with the prospect, remains as his accepted mate. No formal ceremony, no passing of rings, no issuance of certificates, can make a match more binding. The little space of meadow becomes sacred to the newly wedded pair, and nothing short of death will separate them. "Until death do us part" has a real meaning in bird life.

JEALOUSY IN BIRD LIFE

Yet bird nature takes no chances. The male vigorously repels the invasions of others of his sex; and now the female, jealous of her newly found mate, is equally intolerant of straying ladies.

This guarding of territory is more than sexual jealousy. The object of this mating is not simply to gain a pleasant companionship. It has the primary purpose of rearing a family. Young birds have many enemies and must be ready to leave the nest at the earliest possible moment. The rapidity of their growth is almost beyond belief—young sparrows flutter

out, fully fledged except for short wings and stumpy tails, when seven days old, and young bobolinks are not far behind. For such swift development an abundant supply of nourishing food must be available, and every bit of land that can furnish insects and seed for the family must be guarded against invaders.

As soon as family cares are over, the male bobolink loses his handsome wedding costume and assumes the plain, protectively colored plumage of the female and young. The family joins forces with others from the same and neighboring fields, and the flocks roam far and wide, wherever food is plentiful, before leaving for their winter home in Brazil. Territorial claims are forgotten, because the babies can fend for themselves and there is no longer urgent need for easily secured food.

From "Homing with the Birds," by Gene Stratton-Porter Courtesy Doubleday, Page & Co

A CROW WILL STEAL ANYTHING ITS BEAK CAN CARRY
A student of birds on a photographic tour left a valuable lens on a log. A curious crow spied it and was about to make off with it when caught

It is well known that birds return each year to the same nesting sites. Probably they resume control of the same general territory. We shall soon know the truth of that, for the marking of birds with light aluminum bands, bearing identification numbers, is gaining great headway. Already remarkable results have been obtained.

SOCIABILITY Some birds nest in colonies, usually for mutual protection or because of scarcity of nesting sites. Whatever the cause, the gregarious or social instinct is very strongly developed and there is no application of the law of territory. Great

cities, numbering thousands of nests, are often formed, but beyond the possible posting of sentinels in some species, there is none of the division of labor so highly developed among the ants and some other insects. Abundant and easily secured food is a prerequisite for such colonies, and they are most frequent among fish-eating, or at least sea-haunting, birds. In many cases, the competition is reduced from wide territorial rights to actual nesting places. This is especially pronounced among the murres, which breed on rocky islands off the North Atlantic coasts. They build no nests but deposit their single eggs in the tiniest crevices on the face of the cliffs. Since the number of these niches is necessarily limited, they are greatly sought, and fierce battles are waged for their possession. The safety of the egg in such encounters is in great danger, but nature has provided for this contingency, for the egg is shaped like a top, so that it will turn in a very small circle if it is caused to roll. The eggs are strangely and weirdly marked with spots and streaks of color, and investigation leads to the belief that no two are alike and that each bird lays an approximately similar egg year after year. Experienced mothers are thus able to distinguish the centers of their own particular hopes—a difficult feat among so many.

Photograph by A. A. Allen

PRACTICE MAKES PERFECT

An extraordinary photograph showing a swallow training its little one to catch food dropped in flight. This drill prepares the young bird to gain its own living, when, like its mother, it soars and wheels high in the heavens in pursuit of insect prey

Among social land birds the most notable are the weaver birds of Africa and the caciques of South America. Probably the latter colonize for protection and take curious means for insuring it. Some of the smaller species occasionally build in trees overhanging native houses, where they are reasonably safe from predatory birds and animals. The larger species are too shy for this and build in the tallest trees of the jungle. Inspection of many colonies has seldom shown one that did not have a huge wasp nest near by.

No climbing enemy could invade the nests of the birds without disturbing the wasps, and if this should happen it could hardly escape unscathed. The stings of our northern wasps are as nothing compared to the burning shock the great insects of the tropics can administer. A more efficient police system could hardly be imagined.

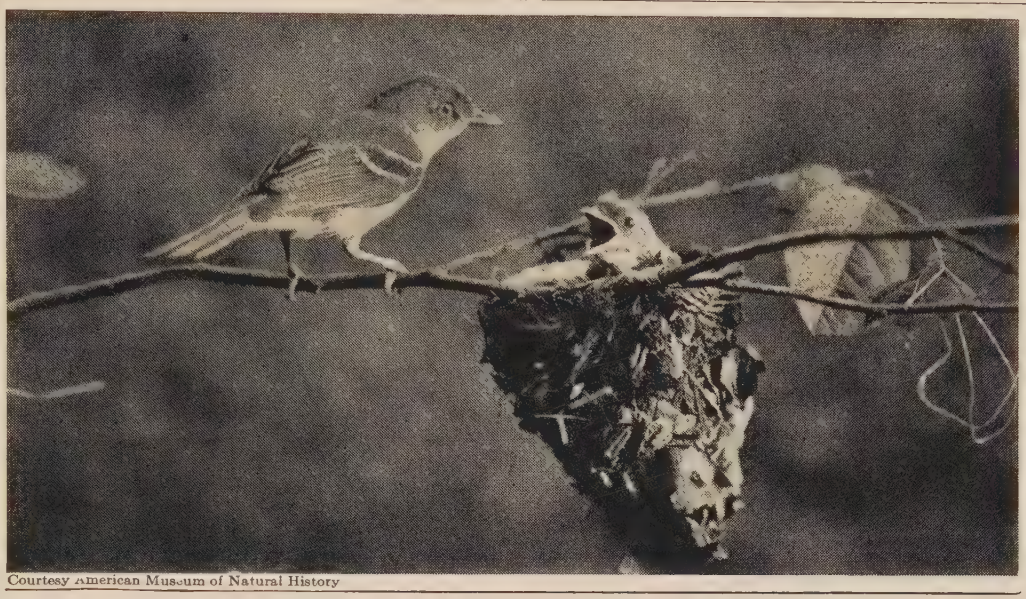
MONOGAMY Most birds are monogamous, and as this form of marriage relation prevails among the highest types of man so it does among most of the higher birds. Some species, notably eagles, swans, and geese, mate for life and remain together year after year. The smaller birds might be equally constant, and perhaps they are, but in those kinds that gather in flocks after the breeding season individuals probably lose much of their identity and certainly their ardor. With the coming of another spring and its impulses, those that have survived the risks and dangers of migration return to their accustomed haunts and, if the old mate also appears, undoubtedly the relation is renewed.

Some writers would have us believe that if one of a mated pair dies the bereaved survivor will remain forever single. It is true that the more constant species do not remate easily and may miss a nesting season if a partner is lost, but when grief (which they certainly experience) has passed, they usually are quite willing to be consoled. Among most birds, strong though the tie may be, little time is lost in grieving. An instance was recently recorded by Dr. A. A. Allen of Cornell University in which one of a pair of phœbes was taken by a screech owl. In a day or two, the survivor possessed a new mate. Within a short time five individuals thus disappeared, the remaining bird, in each case, quickly replacing the lost one. This ready securing of partners has frequently been noted, but just why there should be so many unattached adults

Photograph by A. A. Allen

A SPRING SONG WITHOUT WORDS

Somewhere, hidden in the branches, the one to whom the robin sings listens and understands. The attachment of the redbreast for its mate is more than ordinarily strong and enduring. Twice a year a nest is built of grass and clay, and in it four or five greenish-blue eggs are laid



Courtesy American Museum of Natural History

MOTHERING A NESTLING IS AN ANXIOUS JOB

The white-eyed vireo has eyes of a clear, glassy white. The photograph illustrates one of the strongest forces in the lives of birds—the necessity of securing a constant supply of food for the young, in order to insure rapid growth and early departure from the nest

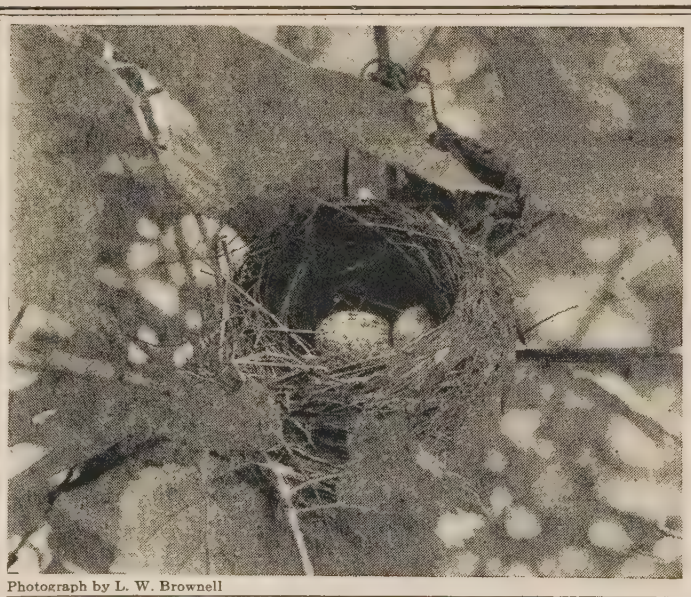
available has always been a mystery. No doubt some have lost their mates through one of the many calamities that constantly threaten the lives of birds, but the majority can be accounted for only by the failure of a certain number of males to secure suitable breeding territory, thus leaving a wandering residue of unmated birds of each sex.

POLYGAMY Polygamy is customary with some birds, particularly certain of the game birds, the great-tailed grackles, and the beautiful long-tailed whidahs of Africa. Each male gathers to himself a harem of from two to five or six females, which he guards with as much assiduity as any sultan. There may be a surplus of females in these species, but probably also many weak or immature males are unable to secure mates.

POLYANDRY Polyandry, the term used to describe a multiplicity of husbands, is an uncommon form of marriage relationship that is found amongst the Tibetans and some tribes of India, and in certain South Sea Islands. A few birds are called polyandrous, though the application is not quite the same. With them, as with the primitive people who practice it, the custom is linked with supremacy of the females. Among certain birds, notably the Australian emu and some other ostrich-like birds, "emancipated" females are the rule. Here the lady does the courting; with the emu this consists largely of a loud booming, accomplished by means of enlarged air sacks in the neck. The emu is a very irregular layer, depositing her beautiful great green eggs at intervals of from two days to a week. No nest is built, and it is the duty of the harassed male to follow her movements

closely, and to cover with bits of grass and straw the eggs she deigns to lay, so that they may have at least some protection. The clutch varies from two or three to as many as eighteen eggs, and just how he keeps track of them all is still among the mysteries. At any rate, when he feels that no more are to appear, he scoops a shallow place in the ground and gathers into it his scattered treasures. Then he humbly begins the process of incubation, a task, by the way, which lasts for eight weeks, actually the longest incubation period known among birds. When the babies finally emerge, he cares for them solicitously, lavishing on them an attention that no mother could excel. This great bird, nearly as large as an ostrich, leading a lively brood of prettily striped chicks smaller than bantams, might serve as a perfect example of motherly(!) solicitude. And so he guards them for a year and a half, leaving them only to yield to the persuasive "boom" that again bends his neck to the yoke. And what has Mother Emu been doing with her spare time, gained at the expense of her downtrodden mate? She has been roaming the country, "booming" for another mate!

A perfect counterbalance for the freedom of the female emu is furnished by the hornbills. These birds nest in cavities in great trees of the jungle. Only one egg is laid, and as soon as it is deposited the male plasters up the opening, leaving only a narrow, vertical slit. Through this aperture he feeds his prisoner, and in due course the youngster as well. Until the latter is full-fledged, there is no other means than the tiny window for communication with the outer world, and yet the inmates of this jungle prison thrive and grow fat during their long period of captivity. The jailer furnishes a plentiful supply of food, neatly wrapped in packets and covered with a filament which is considered by some authorities to be a layer of the lining of the gizzard, and by others a glandular secretion. Father Hornbill plainly believes that "woman's place is in the home," and so he keeps her there.



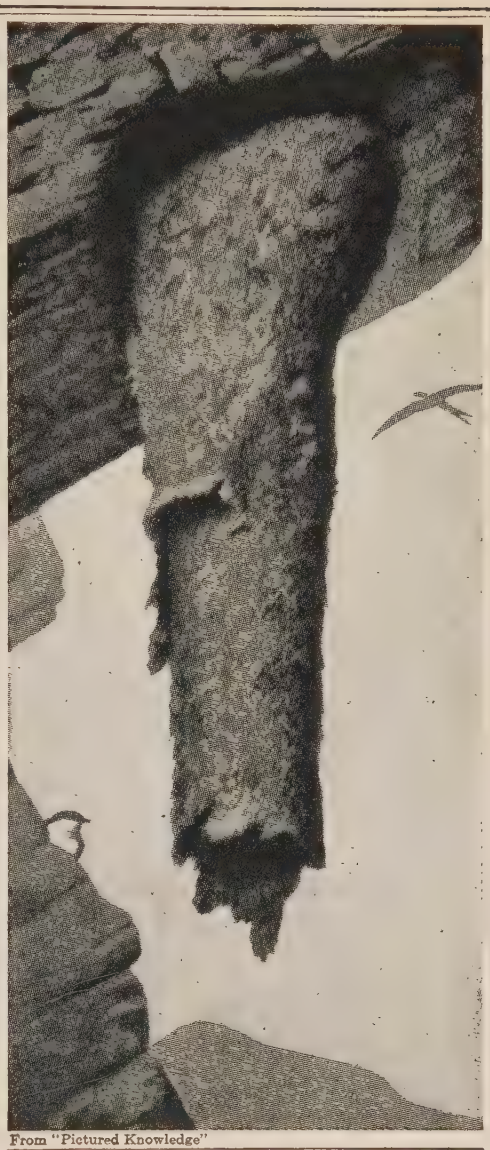
Photograph by L. W. Brownell

THE USURPER ESTABLISHED

Instead of building a home of its own, the American cowbird watches for an opportunity to slip into the nests of other birds and lay its eggs among those of the rightful owner. This picture shows the nest of a chestnut-sided warbler containing the speckled egg of a cowbird. When the young cowbirds hatch, they are so large and voracious that their fellow nestlings often are unable to survive the rough handling of the impostors

PROMISCUITY AND PARASITISM

Two groups of birds, the American cowbirds and the Old World cuckoos, build no nests of their own, but deposit their eggs among those of other birds. Cowbirds and cuckoos often do not pair permanently, but find a mate as chance allows, the female ever on the watch for a likely nest in which to lay her eggs. Cowbirds seem to prefer nests of smaller birds, preferably warblers and sparrows, though their eggs have been found in the nests of some ninety species. The cowbird's egg is white, thickly specked with brown, and quite often twice the size of those of the birds on which it imposes. Occasionally the imposition is noticed by the victims, and the nest is deserted or a second story is built, leaving the intruder to its fate in the subcellar. Most frequently the cowbird's egg is incubated and hatched with the rest, and then, because of the greater size of the interloper, the other infants are likely to suffer or even to die of starvation. Very often birds are seen feeding a single well-grown cowbird—mute testimony of the fate of his companions.



From "Pictured Knowledge"

THE WEAVER BIRD LIVES IN A GLASS HOUSE

The East Indian swallow glues the top of its nest to rock walls and spins a basket-shaped structure with gelatinous threads of saliva that harden in the open air and resemble amber glass

The European cuckoo has developed parasitism to a fine art. Like the cowbird, it prefers to victimize small species, but it has carried the means of deception much further. It has been found that, while the eggs of cuckoos vary widely, each female lays eggs of a constant type. Furthermore, she always imposes on a bird of one particular kind, and investigation has shown that the cuckoo's eggs closely match in color those of her dupe.

It has always been supposed that the cuckoo laid her eggs on the ground and placed them in the nest with her bill, but recent studies seem to show that she seldom, if ever, does this, being enough of a contortionist to worm her-

self into a position where she can deposit her egg directly in the smallest nest.

But the fiendish ingenuity of the cuckoo does not end here. When the young bird hatches, it does not wait, like the cowbird, until its nest-mates die of starvation. Its method is more direct, and perhaps in the end more merciful. Maneuvering until one of its victims is on the cuckoo's back, it crawls up the side of the nest and drops its burden over the edge. The process is continued with unfailing perseverance until the villainous little wretch has the nest and all its benefits entirely to himself.

ARTIFICIAL INCUBATION

Artificial incubation of eggs was practiced in very early times by both the Chinese and Egyptians; but, while the idea was new to men, it was no novelty to birds. In Australia and some of the neighboring islands to the north, a group of birds known as "megapodes," or mound builders, construct primitive incubators of their own design, and use them for hatching their eggs.

The best known of these birds is the brush turkey, an ungainly black creature nearly as large as our own fowl of the same name. The brush turkey has tremendously large and powerful feet, which make excellent substitutes for rakes and pitchforks. At the approach of the breeding season the bird begins the formation of its incubator, by gathering in a great heap the débris of the jungle floor, throwing it backward with great force and often cleaning the earth for yards about. This mound may often reach a height of six feet and a diameter of twelve feet or more. When all is in readiness a hole is dug in the top, extending downward into the central core,

Photograph by Elwin R. Sanborn

THIS BIRD BUILDS AN INCUBATOR TO HATCH ITS EGGS

The Australian brush turkey, an inhabitant of the hot, steaming jungles, gathers together a great heap of débris, lays its eggs deep within the mound, and leaves them to be hatched by the heat generated by decaying vegetation. When the young finally break through their shells they scamper off into the forest, and work out their own destiny without parental guidance

which is to form the incubation chamber. The female then deposits her egg in the cavity and the mound is reclosed. And here is the most remarkable thing of all: the egg is always placed point down. There is no better illustration of the ingenuity of nature, for eggs placed point down will keep better than in any other position, because the delicate cords that hold the yolk in position are attached to the ends.

From "Pictured Knowledge"

A PAVILION OF TWIGS, FLOWERS, AND MOSS

Built by the bower bird for frolic and courtship. These beauty-loving birds spend their leisure looking for decorative bits of petals and feathers, and clearing away faded leaves and blossoms from the dooryard of their playhouse

When the clutch of eggs is complete, the birds watch the mound with great care, keeping it in good condition and immediately repairing the slightest damage. The heat generated by the decaying vegetation is sufficient to give a uniform temperature of about 95°, which is high enough for incubation of the eggs of brush turkeys, though domestic fowls' eggs require 100° to 103°. After six weeks have passed, the first young bird hatches. A day-old domestic chick buried in a heap of decaying rubbish would perish miserably. Not so with this jungle baby. From his parents he has inherited large and serviceable feet, with which he promptly sets to work to extricate himself. When he finally emerges, this precocious infant is already provided with feathers and well-developed wings, and thus equipped fares forth alone into the tangled world to seek his fortune. Independent and free from parental discipline, this prodigy of the wild can, from infancy, make its way perfectly well "on its own."

VANITY The peacock is the symbol of vanity, but the comparison is based on a partial misunderstanding. The bird of Pan is not wholly vain. In fact, during the mating season he is, for the most part, a hard-working bird, his efforts devoted to a very definite purpose—the attraction of the females. The train of the peacock, which is formed by the upper tail coverts and not by the tail itself, is one of the marvels of nature. And yet all this wealth of loveliness seems wasted on the females for which it is

From "Pictured Knowledge"

"WOMAN'S PLACE IS IN THE HOME"

When hornbills have chosen a favorable tree trunk for their nursery the male builds a clay wall between the female and the temptations of the jungle. A narrow opening is left through which to feed her. No danger of her running away like the capricious wife of the emu! Not till the egg is hatched and the baby well grown does he break the wall and release her

displayed. Often a peacock can be seen strutting and spreading, with an indifferent female picking about near by, her back turned to the ardent swain. However, the performer is confident in the tradition of many generations of successful forefathers, so the peahen's lack of appreciation only spurs him on to renewed effort. That his confidence is finally justified is adequately proved by experience.

All this, after all, is no more vanity than can be found in any species with a well-developed courtship display. Yet there are times when the peacock, perhaps as an outlet for surplus energy, allows himself to yield to an impulse that really seems to show the germ of primitive vanity. In the New York Zoölogical Park there are a number of peacocks at liberty. On any fine Sunday in spring these birds may be seen displaying themselves by the hour, often surrounded by hundreds of admiring visitors. On these occasions there is seldom a peahen in sight. As the peacock performs in the sunshine, turning first one way and then another, there is a wave of admiration from the audience, which one senses rather than hears. It is perfectly possible that the bird responds to this stimulus, for he is far more sensitive to such matters than is commonly believed.

FEAR Fear in birds is so obvious that it needs no supporting argument. Its existence is essential to the operation of the primary instinct of self-preservation. In birds it is not the foolish, senseless sort of fear often seen in human beings, but is based on a keen and real desire to escape the violent death that ever menaces birds in freedom.

In young birds fear is probably an inherited instinct, which is fostered and developed by the parents. Just as the solicitous human mother cautions her children against danger, so does the mother bird impress upon her off-

spring watchfulness of enemies. The parents' danger-calls and excited attitudes are quickly associated with cause by the young birds.

Young birds of precocious types, such as ducks and quail, which possess the physical means to escape their enemies, show strong fear reaction much earlier than species like the robin, which for some days must remain helplessly in the nest. Yet tiny, scrawny robins, that raise gaping mouths when they feel the shock that means the arrival of one of the parents with food, will crouch motionless in the bottom of the nest if they feel the slightest jar from a different source.

Frequently, birds reared in captivity under good conditions show an almost total absence of fear, which goes to prove how much they have lost through lack of parental training. When such a bird is placed in company with others it is likely to be stupid at first in avoiding the small dangers of everyday life in an aviary. In most cases, if it does not come to grief within the first few days, experience and the example of its companions soon arouse the dormant instinct and it quickly becomes self-reliant. Occasionally, birds that have been sheltered too long are found to be utterly helpless, and must be carefully protected throughout their lives.

COURAGE

Birds possess courage in a marked degree. The falcons and the eagles are regarded as symbolical of courage, but, while it is true that they are noble birds and seldom craven, their size, strength, speed, and powerful weapons make them so nearly masters of the bird world that little bravery is required to maintain their position. Pure courage for its

Photograph by Elwin R. Sanborn

THE MALE RHEA ✣ INCUBATES THE EGGS

Like Father Emu, the male South American rhea sits on the eggs and rears the young, the female showing complete indifference to the welfare of the brood. The sitting bird flattens himself and spreads his plumage over the shallow nest so as to be almost invisible at a distance

Photograph by Mary Dickerson — Courtesy American Museum of Natural History

NOT YET SURE WHAT IT'S ALL ABOUT ✣

The chickadee's hearty call, "chick-a-dee-dee," rings out as clearly amid the dreary snows of winter as on the fairest day in June. Diminutive creature though he is, there is no reaction on the size of his family; from six to eight youngsters to a brood is the rule

own sake is found in domestic game cocks. The little red jungle fowl of India, the supposed ancestor of all domestic chickens, fights fiercely enough, but when one of the combatants feels that defeat is imminent it will escape from the victor by running, if it can. The endeavor of breeders has been to produce cocks that are "dead game"—that is, birds that will not turn tail, even when death is the penalty. The bloody pastime of cock fighting has been prohibited in most countries, but the dauntless old pit cock still exists—a truer symbol of real courage than any falcon.

In the unselfish duties of reproduction, birds reach a higher level of courage than is usually invoked for self-preservation. Between the two powerful instincts, the desire to live and anxiety for the safety of their offspring, the latter often proves the stronger, even to the extent of the parent bird giving its life. The larger species, such as swans, geese, eagles, and falcons, are well known to resent fiercely any intrusion, and because of their strength and valor are able to beat off most enemies that have the temerity to attack the family. A warlike old Canada goose is no mean adversary even for a man, and many thrilling tales have been related concerning the danger of robbing the nests of eagles.

But it is among the smaller and more helpless forms that we find the

Photograph by A. A. Allen

DINNER HOUR IN THE NURSERY ✣ A black and white warbler returning from a trip to nature's cupboard finds her twin fledglings already at table and eager to eat. Worms and insects are the favorite diet. Young birds will double or even treble their weight in a day, and the quantity of insects necessary to accomplish this explains the value of birds as destroyers of pests

truer courage. Robins, thrushes, catbirds, even the tiny wrens and warblers, will do their best to repulse the skulking cat or blacksnake and sometimes forfeit their lives in the battle. The writer observed a very instructive example of bird courage during the summer of 1923. A pair of phœbes was nesting under the eaves of a roof, just outside a bedroom window. At dawn one morning there was a tremendous racket. In a compartment of the eaves next the one occupied by the phœbes was an old wren's nest composed of a great bulk of rather heavy twigs. A large rat, evidently with murderous intent toward the young phœbes, had been attacked by the mother bird and forced to take refuge in the deserted nest of the wren. Not to be so easily thwarted, the phœbes at once began to tear down the protecting barrier, stick by stick, dropping them to a board walk below with a great clatter. After nearly an hour of hard and persistent work the skulking rat was exposed. The bird promptly attacked him with such fury that he was compelled to leap blindly to the ground and rush into the underbrush for shelter. He never appeared again, and the phœbe reared her young in peace. As well might a human mother attack a wild cat with her bare hands, for phœbes have nothing but tiny bills and indomitable courage to overcome such a formidable enemy as a hungry rat.

COWARDICE Examples of cowardice among birds are not easy to find. The only real bird cowards are the vultures. There are two groups of these birds: those of the Old World, closely related to the eagles, and the New World vultures, which form an order of their own. All are feeders on carrion, and they lack the powerful grasping talons of the eagles, their feet being better adapted to merely holding down their repulsive food

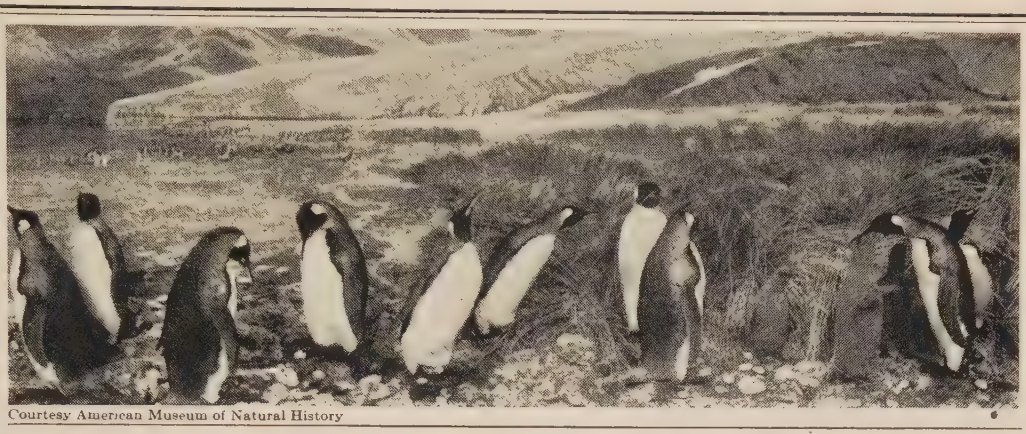
than to seizing it. Their beaks, however, are strong and powerful, more so than those of most eagles; and their size and powers of flight also frequently exceed those of their finer relatives. However, they prefer to watch and bide their time rather than attack their intended prey, no matter how helpless it may be. The great lammergeier, or bearded vulture of the Alps, is said to drive lambs, and sometimes even men, over steep precipices, and then to descend and make a leisurely meal on the mangled remains at the bottom. This is probably as near as any vulture ever comes to direct attack.

Some years ago, in Costa Rica, the writer witnessed an incident that furnishes an illustration of the cowardice of vultures. An unfortunate calf lay dying. A flock of black vultures hovered in near-by trees—grewsome harbingers of death. So in grim vigil a night passed.

Next morning a new element was injected into the affair, for on the body of the calf was perched a solitary king vulture. This bird is about twice the size of the more common black vulture and consequently more powerful, but at the same time it is not notably aggressive. Just what its power is seems to be a question, but at any rate here was the "king" in full possession of the prize, surrounded by a circle composed of some hundreds of his craven inferiors, milling to and fro at a respectful distance. He was a picture of lordly indifference, calmly preening his plumage and making a leisurely inquiry into the food situation. Eventually he was joined by two others of his kind, and when operations had been completed, little remained except bone and sinew. Having satisfied themselves that nothing really edible had been overlooked, the banqueters performed a fastidious toilet and relinquished the

Photograph by Elwin R. Sanborn

A FAMILY OF MUTE SWANS ✣ Like the geese, the swans are model family birds. Both parents are diligent in the care of the young, and the male is a dangerous antagonist when he feels that his family is in danger. In times of stress, the female takes the cygnets on her back, beneath the cover of her wings, and bears them to safety



Courtesy American Museum of Natural History

PENGUINS ON PARADE

In appearance the penguins are the most human-like of birds. They walk erect and have no powers of flight. They breed on the shores of the Antarctic continent under rigorous conditions. The feathers are short and small; the wings are developed into flat paddles that propel the bird under water

figurative crumbs. Instantly an annihilating wave of black engulfed the scene of the feast, and a few seconds later nothing remained but bones picked as clean as though they had been bleached by the sea. What mysterious force held back this rabid crowd as it watched the appropriation of the food it so eagerly craved? Surely it was cowardice not far removed from that shown so often by human mobs when confronted by the force of a personality before which they recoil.

GLUTTONY Some birds, like men, are prone to gluttony. Here again we cite the vultures, which really seem to be the most despicable of birds. It is only fair to say, however, that theirs is not the willful sort of gluttony indulged in by gross individuals of our own race. It is due primarily to food conditions, for the vulture may chance upon the fatted calf on one day and have no further opportunity to break his fast for a week. Consequently, when he eats he feeds to repletion, for he knows not when he will eat again. In tropical countries it is a common sight to see vultures gorged to such a degree that they are unable to rise and must skulk on the ground.

PLAYFULNESS Birds are busy creatures, so real play among them is scarce. Some, however, know real play—ducks and pelicans amuse themselves. A frequently quoted example is the satin bower bird of Australia. The male builds a fairy playhouse by pushing two rows of sticks into the ground, six or eight inches apart at the bottom and inclining toward each other at the top. The structure is fifteen to eighteen inches long and open at each end. Sometimes the female lends a hand, and when she does the male watches her tolerantly until she has finished and promptly rearranges whatever additions she has made. The ground about each opening is kept perfectly clear and is then decorated with odd bits of bone, shells, feathers, etc. When all is in readiness we find that this preparation is not merely for play but for courtship. Seizing in his bill whatever treasure is

the favorite of the moment, the male begins a grotesque dance, singing the while in a grating guttural voice. If the female cares to join in the game, he outdoes himself in buffoonery, pursuing her back and forth through the playhouse until she tires and returns to the tree, where the real nest is built.

DEVOTION TO OFFSPRING

There is no limit to the sacrifices birds will make for the protection of their young. Many birds, such as the grouse and plovers, will even go so far as to simulate injury when their chicks are in danger. Flopping, stumbling, and even falling over and over, they seek to lead the enemy away, quickly recovering from the mysterious malady when the hidden youngsters are safe. In securing food, birds work with great diligence, often to their own injury.

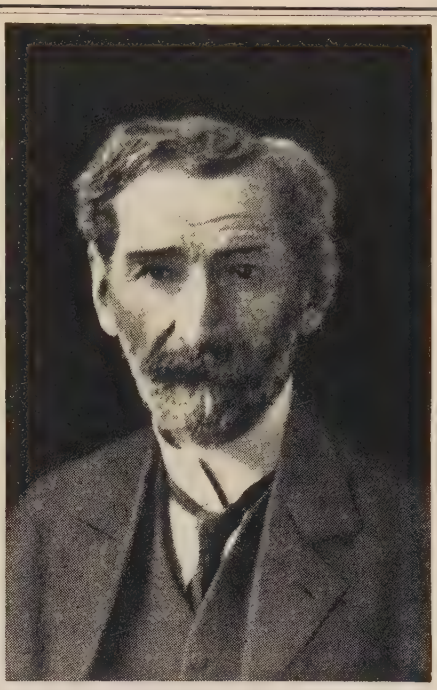
In the Zoölogical Park we have had an interesting example of overdevelopment of parental love. Several pairs of Canada geese on a small lake had broods of goslings ranging from three to five. One of the pairs managed to get through a supposedly goose-proof fence, and moved their family to a well-kept lawn in search of tender young grass. After a few days, which established in the first-comers a strong sense of possession, another pair found the weak point in the fence and appeared on the lawn with their brood. Immediately the original gander gave battle, and that afternoon the newcomers were back on the lake, but *minus their family*. This assault on neighbor broods continued for several days. As the spoils of battle the kidnapers had acquired no less than ten strange babies in addition to their original three. In spite of a great diversity of size and a consequent variation in strength, the entire thirteen were triumphantly reared. The foster parents used to assemble their charges on the park lawn to the apparent aggravation of distraught mothers and fathers that lurked powerless in the offing.

Photograph by the author

KIDNAPERS AND THEIR BROOD ✣ A pair of Canada geese bred in the New York Zoölogical Park are shown with goslings of various colors and sizes, stolen from other broods and reared as their own

THE BIRDS' BEST HUMAN FRIEND— W. H. HUDSON

BY ARTHUR MAURICE



W. H. HUDSON
WRITER AND FIELD NATURALIST
"He did for the English country that he studied what a great painter can do for a view of natural scenery: he brought out points that might otherwise have escaped attention; he made the beauty and interest of it arrest and hold the attention; he made people feel what he himself had felt when watching and contemplating"

W. H. Hudson lived to four-score years, and when he died two years ago the birds lost their best human friend. Most of his years were devoted to preaching and practicing love of wild life, and particularly love of wild bird life. It was his ruling passion. The birds were the companions of his soul. Upon their coming and going depended his joy and interest in the particular place where he happened to be staying.

If Hudson could have molded the world to his liking it would have become a vast sanctuary for the birds. Always in his soul was the spirit of hot rebellion against man and his ways. The wild moorland swept by sea winds over which he so loved to wander he felt to have been created for feathered flight, for the building of nests and the chirping of love songs. The mere presence of man seemed an intrusion on the territory of his beloved wild birds.

What a strange wild life was the life of this man! He was always somewhat of a mystery, even to the closest among his human friends. Perhaps the birds understood him better. Perhaps he was no mystery to the wild geese and the wise white owls. To the creatures of the air he abandoned his soul. It was a locked and guarded cavern against his fellow men. Even his own brother said to him, when the time for their long parting came, and W. H. Hudson went on board the steamer that was to carry him from South America to England: "Of all the people I have ever known, you are the only one I do not know."

His own reticence about his early life shrouded it in mystery. He was born in the Argentine. His father, Daniel Hudson, was born in Marblehead, Massachusetts. His mother, Catherine Kimball, was of the old Puritan stock. Her family were said to possess a Bible out of the "Mayflower." Some years before his birth W. H. Hudson's parents emigrated to South America, Daniel Hudson finding his health threatened by the harsh New England

From "Birds in Town and Village"

THE NIGHTINGALE'S MORNING SONG

"The medicine of its pure fresh melody I particularly craved. . . . A favorite morning perch (of a male bird nesting near Hudson's cottage) was a small wooden gate four or five yards away from my window"

climate. In the subtropical Argentine he adopted sheep farming as a career, and lived to the ripe old age of eighty-four.

The pampas were the home of W. H. Hudson during the first twenty-eight or twenty-nine years of his life. Restlessly he wandered, storing away the impressions upon which he was to draw in later days. He traveled beyond the Rio Negro southward, to Banda Oriental, across the wide waters of the Plata. But not the South America of his own birth, nor the United States of his parents, but the England of his ancestry was always the land of his dreams. Finally, when he was about twenty-eight, he sailed from Buenos Aires, never to return to South America. He arrived in England in May and found it "a land of the morning."

Just as the years in South America are veiled in a certain obscurity, so are the first ten years of his life in England. They were pathetic years, pathetic in their poverty and lack of recognition. He married a woman many years older than himself, how much older he never knew until her death. In 1880 she was keeping a boarding house in Bayswater, a part of London. Hudson, reduced to the shabby rôle of a boarding-house keeper's husband, to carve at table, and to answer the doorbell, was like a caged eagle. Even then the depths of misery were not yet sounded.

The Bayswater boarding house was a failure. Husband and wife moved to another part of London, and started a rooming house there. It was another failure. They moved into pitiful lodgings, and for a time were practically starving. One week they lived on a tin of cocoa and milk. The wife, who had been a singer, trudged about giving lessons and Hudson at home toiled at writing articles that were generally rejected.

The unhappiness of that period is reflected in a letter written by Hudson long years after: "When I had not a penny and almost went down on my knees to editors, publishers, and literary agents, I couldn't get even a civil word, and of ten or perhaps twenty manuscripts sent out, nine or nineteen would come back. And now, when I don't want the beastly money and care

nothing for fame, and am sick and tired of the whole thing, they actually come and beg a book or article from me."

Yet even in the caged years he was in communion with the birds. The wood pigeons were his companions in such places as the Temple Gardens, St. Paul's Churchyard, and Trafalgar Square. In the more extensive parks of London, such as Hyde Park and Regent's Park, he found the water birds: the water hen, coot, and wild duck. Appropriately, it is in Hyde Park that there has been established the birds' sanctuary that is dedicated to his memory.

Then a freer, wilder life than that in grimy London opened for him. At times it was almost gypsy-like and exceedingly hard for the wife who shared it with him. By his side she trudged patiently scores of miles through highways and byways. She endured the rough lodgings which not only suited their light purse but which pleased him better than any inn. She sat on village greens while he sought for rooms with cottagers. Of the two she was always the more pathetic figure, for with the weight of an age fifteen years more than his own she was trying to live as the mate of an eagle. Eventually she broke under the strain, and died, and Hudson buried her in the cemetery at Worthing, where lie the bones of Richard Jefferies, Hudson's brother naturalist.

In various places of England Hudson lived and studied. He was at home in village or market town, near a woodland or by the sea where wild geese came or herons built. There were occasional stays with his friend Morley Roberts, in the latter's Sussex home. "With him," Roberts has recorded, "a walk in the woods or by fertile hop-fields became a new thing. The chattering jays took on brighter colors for me, the woods were more populous, since birds I thought alike he distinguished by notes I never could remember."

A WATER HEN AT HOME IN HYDE PARK, LONDON
Protected by laws that Hudson and his associates helped to formulate

At first Sussex and Hamp-

AN URBAN PLAYGROUND FREQUENTED BY HUDSON

Geese, owls, seagulls, were among Hudson's prime favorites. It always gave this devoted bird lover joy to see the feathered inhabitants of London parks happy and well cared for

shire and Wiltshire were enough for Hudson. He maintained that a man could spend his life on the downs or near Salisbury or in the New Forest and find occupation till he was a hundred, and laughed at the suggestion that the more remote Cornwall offered a richer field for his observations. But the time came when he made a reluctant visit to Land's End, and as a result he took to wintering at Penzance.

Curious was that passion for England in a man not born on English soil. But it was not a passion for the smoke-smudged haunts of men, but for the green spaces untouched and undefiled, the bit of woodland where the small birds chirped, the wild coast where the gulls and wild geese circled and the heron and curlew called.

Hudson's life in England was one of constant war against the inveterate bird destroyers. He divided them into three classes: first, the so-called sportsman, who kills for killing's sake; next, the gamekeeper, who has made a list of the different species of what he calls "vermin" to be extirpated; and, third, the greedy collector. Beyond the bird collector his hatred went to the feathered women. He could not bear the sight of a "civilized lady" wearing the plumage torn from the body of a bird.

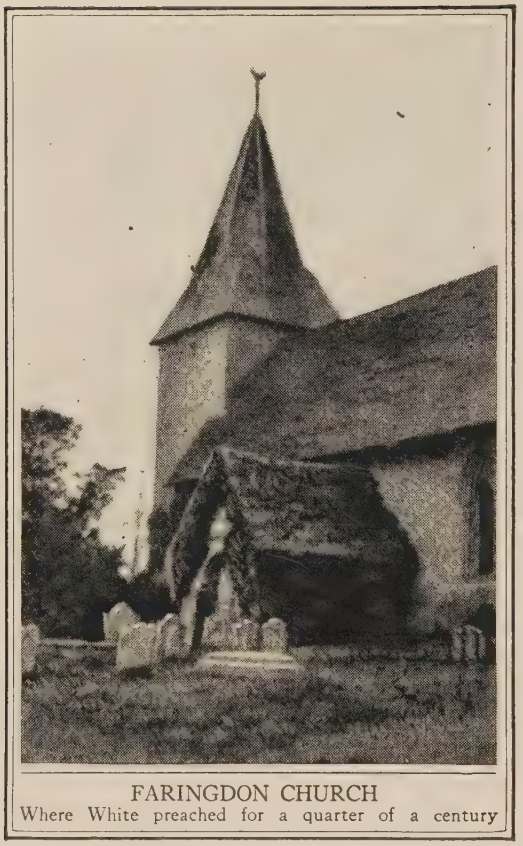
Bitterly as he assailed those who killed birds, his hottest indignation was reserved for those who imprisoned them. Throughout his books are stories of his efforts to win liberty for caged bullfinches and linnets. Once in a cathedral town of England he fought fiercely but in vain for the freedom of a wretched white owl imprisoned in a kitchen by a glaring fire. When he failed to free this prisoner he was ashamed to go near him: "For I had promised him his liberty and could not keep my word."

Loving all birds, Hudson had his favorites. Wild geese were his passion. Perhaps they reminded him of the greater birds of the South American pampas of his birth, for, despite his devotion to the England of his ancestry and his adoption, he never forgot his native land. When watching the wild geese he could recall the crested screamer, a bird of mighty powers of flight and a mighty voice, whose gatherings and tremendous music he had seen and listened to as a boy. In England he found a kindred spirit in the wild goose.

To the end Hudson lived steadfast to his trust, and when his biographer saw him lying dead the idea of burying him as mortals are buried did not seem right. "I wished to take him out upon the open pampas, with a long wide view beyond the sight of man even on horseback, with the great clear sky above. So I would have digged a grave and put him there to rest in his blanket just as he had fallen asleep, without disturbing his attitude of quiet peace. To have the wild winds sing about him and the wilder beasts crop herbage from his lonely grave, while birds trumpeted high choruses about one who loved them—that is the grave I would have chosen for him."

ENGLAND'S ✣ MEMORIAL TO HUDSON ✣

London and its environs were peculiarly the field of this writer's observations. Most appropriately, Hyde Park was chosen as the site of the bird sanctuary planned by the friends of the naturalist as a permanent reminder of his contribution to bird lore



FARINGDON CHURCH
Where White preached for a quarter of a century

GILBERT WHITE OF SELBORNE

BY J. PENNINGTON

Gilbert White's "Natural History of Selborne" is a human document of such exquisite charm that it has made famous not only its author but also the remote English village where he was born.

W. H. Hudson, who has written much of White and of Selborne, attempts to analyze the enduring quality of the obscure eighteenth-century clergyman's work: "Why does this little 'cockleshell of a book' come gayly down to us over a sea full of waves where so many brave barks have foundered? . . . I would humbly suggest that the personality of the author is the principal charm of the letters, for, in spite of his modest and extreme reticence, his spirit shines in every page." John Burroughs remarks "its low key. It touches only upon minor matters. And yet it has lived a hundred years and promises to live many hundreds of years more . . . it is simple and wholesome. It has a home air, a certain privacy and particularity."

The bachelor curate is often represented as a kind of recluse, an ascetic, but this was not true. "The Wakes," his famous dwelling place, saw frequent family gatherings. At the time of his death he had over fifty nieces and nephews. He was a great traveler, though always on horseback. He often rode to London, about fifty miles away, to visit his brothers.

Gilbert White was born in 1720. On graduating from Oxford he took orders. For twenty-five years he preached in the parish of Faringdon, two miles from Selborne, always hoping for the curacy of his native village to fall vacant. Eight years before his death his patience was rewarded. He was described by one of his parishioners as "a still, quiet man with no harm in him; no, not a bit."

There is no authentic portrait of the sage of Selborne. His refusal to sit for his picture is attributed to the fact that an attack of smallpox had left him badly marked.

The only event in White's life that was of any lasting importance was the writing of the "Natural History"; and this he began when he was about forty without knowing that he was beginning a book. The origin of the now celebrated work lay in a series of letters written out of kindness of heart and with no thought of publication. On a journey to London, he visited his brother's bookshop and publishing house. In this "roomy shop, with old gentlemen in leather doublets," White met Thomas Pennant, author of "British Zoölogy." Discovering their common interest in natural history, White agreed to write regularly to Pennant, setting forth his observations of bird, plant, and animal life. Two years later he met another observer, Daines Barrington, and consented to write to him also. It was Barrington who first had the idea that these letters were worthy of publication. Though pleased and flattered at the suggestion, White was too modest to begin revising the letters until urged on by his friends and family. It was nineteen years before the book took tangible form. "As this is your only child," wrote an impatient friend, "I hope you will not let it be a posthumous one."

In no way do the charm and humanity of the clergyman-naturalist show more clearly than in his record of observations made concerning birds and animals. He tells, for instance, the story of two birds, a male and a female, who built their nest most unwisely on a naked bough and thus exposed their brood to the hot sun. "Affection suggested an expedient," he tells us, "and prompted the parent birds to hover over the nest all the hotter hours while, with wings expanded and mouths gaping for breath, they screened off the heat from their suffering offspring." For years he studies the ways of an old tortoise. He marvels at the "extreme timidity it always expresses with regard to rain, for, though it has a shell that would secure it against the

From a drawing by Edward J. Sullivan

THE AUTHOR OF THE "NATURAL HISTORY"

A sketch made from contemporary descriptions of his dress and personal appearance. There is no authentic portrait of the Sage of Selborne

wheel of a loaded cart, yet does it discover as much solicitude about rain as a lady dressed in all her best attire, shuffling away on the first sprinklings and running its head up in a corner." He is mildly amazed that "Providence should bestow such a profusion of days, such a seeming waste of longevity, on a reptile that seems to relish it so little as to squander more than two thirds of its existence in a joyless stupefaction and to be lost to all sensation for months together in the profoundest of slumbers." "Sounds," he makes remark, "do not always give us pleasure according to their sweetness, nor do harsh sounds always displease. The shrilling of the field cricket, though sharp and stridulous, marvelously delights some hearers, filling their minds with a train of summer ideas of everything that is rural, verdurous, and joyous."

On his first visit to Selborne, W. H. Hudson went to the churchyard and "spent a long time groping about in the long, rank grass in search of a memorial, and this, when found, turned out to be a modest-sized headstone. I had to go down on my knees and put aside the rank grass that half covered it, just as when we look into a child's face we push back the unkempt hair from its forehead. On the stone were graved the initials 'G. W.' and, beneath, 1793, the year of his death. Happy the nature lover, who, in spite of fame, is allowed to rest as White rests, pressed upon by no ponderous stone; the sweet influences of sun and rain are not kept from him; even the sound of the wild bird's cry may penetrate to his narrow apartment to gladden his dust."

WHITE'S HOME, "THE WAKES" — In the village of Selborne, Hampshire, England, the clergyman-naturalist made most of his observations in his own dooryard. His letters on nature were written in an upper room of the rectory

THOMAS MORAN - N. A.

THE GRAND OLD MAN OF AMERICAN ART

BY
GUSTAVE H. BUEK

THOMAS MORAN

From the portrait by Howard Russell Butler, painted from Life—at Santa Barbara, Cal., in 1922, when Mr. Moran was 86 years of age

THOMAS MORAN, N.A.

THE GRAND OLD MAN OF AMERICAN ART

THE MORAN HOME AT EAST HAMPTON, LONG ISLAND

In which the great painter spent 40 years of happy, active and productive life

I FIRST met Thomas Moran in the Summer of 1892. I had been commissioned by the Santa Fe Railway to reproduce by lithography his painting of The Grand Canyon of Arizona, one of the conditions being that the reproduction before acceptance should be endorsed as satisfactory by the artist. Knowing Moran to have done some excellent lithographing himself, as well as being master of practically all the then known reproductive methods, I naturally approached him with considerable hesitation. No man could have received a younger man with greater cordiality than he received me.

Through my visits at the National Academy and Water Color Society Exhibitions at the old Academy at the corner of 23rd Street and Fourth Avenue, New York City, I had, before this, become acquainted with the work both in oil and water-color of Moran, and had early been drawn to it by his remarkable draughtsmanship and feeling for color. To my mind he stood far in advance of most of his contemporaries.

During the years following that first meeting at his charming home in the old village of East Hampton, Long Island, I enjoyed many opportunities for companionship with the artist and for close observation of his work.

Thomas Moran was born in Bolton, England, in 1837, of Irish-English extraction, and was brought to America at the age of seven After a fair education in the public schools of Philadelphia, he was apprenticed to a wood engraver in that city. He very soon showed a decided aptitude in drawing, and with a strong imaginative disposition and a keen love for color, he took up sketching in water-color, but as early as 1857, when twenty years of age, he painted his first picture in oil.

He sailed for England in 1861, seeking larger opportunities for self-improvement. While in London he made a special study of Turner's works in the National Gallery, several of which he carefully copied. His admiration for Turner has undoubtedly influenced him as a colorist, being quite traceable in some of his earlier works, though never to

such a degree as to indicate the effacement of his own individuality. Moran revisited Europe in 1866, returning to America in 1867, and was offered the opportunity of accompanying the United States Exploring Expedition conducted by Professor Hayden to the Yellowstone River in Wyoming Territory. The result of this expedition was Moran's great painting of the "Yellowstone Canyon," which was purchased by Congress for $10,000—a large figure at that time.

Again in 1873 he accompanied the expedition conducted by Major Powell, under the auspices of the Government, to explore the little-known country through which flows the Colorado River. The tremendous character of this part of America may be gathered from the fact that for 200 miles the stream descends at the rate of 200 to 500 feet a mile through a chasm averaging less than 300 feet in width. The walls of this vast gorge are 5,000 feet in height, and, at some points, the cliffs seem to close overhead and to leave only a faint crack through which the sky dimly appears. It is one of the more picturesque and less forbidding aspects of this river that appears in the painting made by Mr. Moran on his return from his expedition. He called it the "Grand Chasm of the Colorado." This, also, was purchased by Congress for $10,000, and hangs in the Senate Gallery at Washington.

While he does not belong to the accepted school of impressionism, he nevertheless is an impressionist. "What I ask," he says, "is to see a man's brains as evidenced in his work. I want to know what his opinions are. He is the arbiter of his own pictures and nature. Zola's definition of art exactly fills my demands when he said, 'Art is nature seen through a temperament.' . . . An artist's business is to produce for the spectator of his pictures the impression produced by *nature on himself.*"

Mr. Moran always upheld the importance of fidelity in detail in producing Nature—a fidelity that can only be achieved by fullness of knowledge. In the painting of a landscape, a thorough knowledge of the formation of clouds, of rocks, of trees, of the ground itself and all that it holds, is necessary.

"In art, as in any other profession," Mr. Moran maintained, "knowledge is power.

THE STUDIO AT EAST HAMPTON, LONG ISLAND

In which the greater part of Mr. Moran's work was produced

MR. MORAN'S HOME AT SANTA BARBARA, CALIFORNIA

Where he is now enjoying well-earned restful days

Twist this in any form you may, it remains a truth, and the foundation stone of all art. It will always be the same, and will always show itself in the pictures of the artist, no matter how humble, or how pretentious. Just how far the artist shall go with his knowledge is left to him. He must typify his own personality. This covers all—taste, opinions, everything. The man must exhibit himself in his pictures. This is the theory of art, and also of judgment. Knowledge in art is the power behind the hand-work. Eyesight is nothing unless backed by brains. In condensed form this is my theory of art. In painting I have to be full of my subject. I have to have knowledge. I must know the rocks and the trees, and the atmosphere and the mountain torrents, and the birds that fly in the blue ether above us. Whatever of arbitrary forms that grow out of this intimacy with nature becomes a part of the work is altogether legitimate because my knowledge of the topic leads me to take liberties."

As was once said of one of the great masters of the Barbizon School, "There is something deeply serious and sensitive in his soul, which made him a fit instrument for the rendering of those grand harmonies of Nature's more dramatic side. Thoroughly saturated with a love for art—endowed with a positive and original genius, with an intense love of nature and a sensitiveness to her more delicate beauty, all nature was grand, and revealed to him her most poetic side. Serene, calm, and joyous, he painted the beauty about him with deep devotion to nature, to which he was thoroughly attuned.

"He absorbed the beauty of all her many moods, and with a devotion that was never surpassed, gave his life to the placing upon canvas the lessons learned from her. He did not try to make her conform to a preconceived idea of what art should be, but painted the beautiful impressions that the subject gave him. There is always the freshness of nature in his pictures."

Every word of the above can truthfully be said of Thomas Moran. No painter was ever more conscientious in his work than he; none more devoted in spirit, none more uncompromising in integrity.

He does not like to be called "The Scientist Artist"; he frankly admits that his is not the scientific mind, that masters and retains—that carefully stores up for future reference and use the visible facts in nature. But he has a marvelous memory that holds these facts, ever ready at his command, as I have had many

occasions of observing. I know of no other artist, whose work, while done in love of all that is great and beautiful in nature, is yet so thoroughly correct in a scientific sense as the landscape painting of Thomas Moran. His mind seems to be a sensitive plate, on which every phenomenon in nature has been impressed.

And how varied in subject is his work; how marvelously many-sided is Moran in all he does! He is equally at home, whether painting the superb scenery of the Rockies, the Grand Canyon of Arizona, or the Yellowstone, the Yosemite Region, the tropical scenery of Florida or of Old Mexico, the quiet, restful stretches of Eastern Long Island, or the peaceful pastoral scenery of England. Again, we see the master touch in his paintings of the enchanting canals and fairy-like architecture of Venice, and the grandeur of the ocean in her stormiest moods, when wave and sky combine to challenge the artist's skill.

WINTER IN THE ROCKIES

An early painting by Thomas Moran; painted in 1867

Generally speaking, he is a patient worker, and while quick to conceive or select a subject, he is conscientiously deliberate in carrying it out. And not infrequently, as the mood or a sudden impulse strikes him, he completely changes his subject when half finished. I have known him to change a carefully constructed snow-capped mountain range into a raging storm at sea; the formations of the mountains suddenly giving him the sense and feeling of white-crested waves with their heights and depths. These ocean scenes, of which he did not paint many, are eagerly sought after. John Ruskin, upon seeing one of Moran's marines, emphatically pronounced it "the finest piece of water drawing he had seen."

No painting ever left his easel that was not considered by him to be the very best that he could do at the time, and none that was not considered by him as "finished." He is incapable of slighting or misrepresenting a fact, incapable of doing what he does not feel to be just to his art and to himself. Thoroughly honest and sincere in his art, as in his life! On one occasion I took a friend, who was not especially an admirer of the work of Moran, to his studio in 22nd Street, New York City, and we found him working on a half-finisned painting of a Western scene. The subject had been boldly laid in in broad masses and looked quite different from one of his finished paintings. My friend was captivated by the work in that state, and, taking me aside, asked me to persuade Moran to leave the canvas exactly as it was, and sign it; adding that he would gladly pay the price that Moran would ask for it when it was finished.

This request I communicated to Moran. He declined absolutely, saying that the painting, as it was, was not correct as to geological facts and consequently could not leave his studio in that state. Another example of his insistence that his painting must have his own complete endorsement before leaving his hands was when a prospective buyer (a collector having one of the finest collections of paintings in the country, and a man of enormous means) offered to purchase "The Shoshone Falls," one of Moran's great paintings, at the price asked ($15,000), if he would change the character of the sky. This he refused to do, although urged to do so by his friend, Hopkinson Smith. In consequence, he lost the sale—which was preferable to him to losing the feeling of locality imparted by the sky as originally painted.

Such incidents show the sincerity of the man.

Since my first meeting with Thomas Moran, I have had occasion to spend many hours with

him, both in travel in the Far West, in his studio and home, as well as in my home; and while I regret that I cannot clearly recall the many interesting talks with him on art, travel and literature, and must consequently rely largely on interviews in which he has expressed himself to others as well as to me, still I hope to convey a slight idea of the man and his attitude toward a subject that has engrossed his entire active life, and that still to-day, in his eighty-eighth year, when he has practically laid aside his brush and palette, and while still in good health and spirits, is his constant thought — The Art Movement in America by American Artists.

In an interview some years ago Moran made this statement as to his adoption of America as the field of his operations: "I decided very early that I would be an American painter. I'll paint as an American, on an American basis, and American only. I traveled the country over and the West appealed to me. I like the comparatively flat land of Eastern Long Island, such as I have near my studio at East Hampton and Montauk; and then I like the rugged mountains of the Rockies."

PORTRAIT OF MORAN

Taken in 1873, when he was 36 years of age

Moran's earlier work, at times, shows a multiplicity of detail, often to an inordinate degree, but this was at a time when he was the careful and conscientious student of every fact in nature that would or might add to the interest of his subject. As his work broadened, this knowledge of details was most valuable, enabling him

MR. MORAN

As he appeared when starting out on the exploring trip of the Grand Canyon region with Major Powell in 1873

SOLITUDE

An early lithograph by Moran. He used this same motif and title years later in his celebrated painting, "Solitude"

THE GRAND CANYON OF THE COLORADO

Mr. Moran's painting, purchased by Congress, and which now hangs in the Senate Gallery in the Capitol at Washington

to introduce them at will and yet subordinate them so that they, in nowise, interfered with or disturbed the general effect. This knowledge of detail was especially valuable to him in painting his great pictures of the Far West, where flora and fauna are an important and essential part of the scene depicted. In writing this, I recall the remark made to me by one of our foremost artists, when looking across the Grand Canyon on a remarkably clear day: "How I could paint this, if I only had Moran's *knowledge!*"

Moran's work throughout his entire life suggests refinement. Refinement is the key-note. It is found in his painting of the architecture of Venice, and of its brilliantly picturesque life on the Canals; it is found in his painting of the great snow-capped mountain ranges of the Rockies, and in the colorful buttes and mesas of New Mexico and Arizona. Always refinement, born of and backed by knowledge, and yet never sacrificing vigor of drawing.

The versatility of the man is amazing, and can be accounted for only by the fact that his knowledge of the component parts necessary to the construction of his pictures is so thorough that he is never at a loss for original compositions.

His studies from nature are very carefully made, almost without exception in water-colors, and if found necessary, supplemented by accurate drawings in pencil or wash. The facts noted in these studies become so firmly fixed in his mind that he needs seldom to refer to them when painting his pictures.

Those that have been fortunate enough to go with him over the hundreds of sketches in water-color and in black and white—the results of the many trips made by him during his long and busy life—have enjoyed an experience never to be forgotten.

Notable among the sketches are those of the Rio Virgin in Utah, and of the Grand Canyon made in 1873. These first sketches of that part of our country, which were the art means of bringing the grandeur and beauty of that Far Western scenery to the American people, have a value all their own. It is pleasant to know that Moran has presented many of these sketches to the Cooper Institute in New York City for the benefit of the art students of that institution.

His travels took him, not only into our Great Western Country, but into Florida, Mexico and the West Indies, as well, and extended throughout Europe, especially into Italy and England, in all of which places he found material for paintings. His well-known painting of "Mount Moran" in the Teton Range, "The Mountain of the Holy Cross" in Colorado, his great historical landscape "Ponce de Leon in Florida," and his paintings full of the dreamy beauty of Venice are but a few of the outstanding results of these trips.

THE MOUNTAIN OF THE HOLY CROSS, COLORADO

From the original water-color. This composition was later used by Mr. Moran in a painting by the same name

And now, in his eighthy-eighth year, after seventy years of active studious work, knowing that his great work is done, standing at the twilight of his life, he has the great satisfaction of knowing that, in the integrity of his character, and the sincerity of his work, he has added beauty to the world, and value to American art.

THOMAS MORAN; AN IMPRESSION

By His Daughter, RUTH B. MORAN

THE outstanding memory of my father; the first impression was, and I believe the last impression will be the atmosphere of romance that he had about him; he seemed always to be starting off or coming back from strange, beautiful places, wild countries. And then at once on the return I would be thrilled by the lovely colors that almost at once began to grow and glow on canvas and water-color pads, and the delicate, beautiful drawings on the blocks of boxwood.

I used to come padding down in my night-gown and bare feet, lured by the talk that drifted up the stairs to my crib, and curl up in my mother's lap to be nearer, night after night, as my father sat drawing numberless illustrations for school books and magazines — all the then new wonders of the "Far West" that so captivated and thrilled him with their beauty and romance.

THOMAS MORAN IN HIS 86TH YEAR

With his daughter, Ruth B. Moran, at their home in Santa Barbara

Thomas Moran's whole figure was romantic; perhaps the more so because of the utter lack of self-consciousness—the eyes not dreamy but clear and far-seeing, shining like a child's eyes. Always they have had, and still have the look of seeing, and remembering, wonders. His mouth was delicate for a man's, but practically hidden by his beard and moustache of fair hair—his nose was delicate and sensitive. He used always to wear, in winter, a round beaver fur cap, set rather jauntily on his very small, compact head. Nearly five feet seven inches in height, thin, wiry, and quick and firm on his feet, with perfect balance—he wore his cap and cape coat, rather gallantly. Yes, he was a romantic figure, in a not very romantic period. He was quick-witted, full of humor, kind and very generous; but quick-tempered, also, and a good fighter for any cause that he might take up.

He loved music, playing the violin by ear only, but playing with spirit; and as I first remember him, always singing with a good, sweet tenor voice. Loving his children, but forgetting them so completely when at work—which was practically always—that I have no recollection of ever asking, or depending on him for anything.

I do not think he ever reproved me or attempted any kind of discipline in his life; he did not believe in discipline for children, nor the theory of discipline for anyone. His children, three of us, loved him, and never felt the least awe or fear of him, but always instinctively an awe of his work. He, himself, disappeared so completely in it—was so rapt in it—that we children never had to be told, or taught, to reverence it — it was always the first thought of all of us—as it was practically the whole thought and life of my father.

We lived closely as a family, always in and out of the studio, but we never disturbed my father. We would lie flat on the floor and watch him paint, or use his water colors to paint the pictures for ourselves in the old pictorial magazine, *The Aldine;* or we would shudder with delightful horror over the Dore drawings in Dante's "Inferno," which was always in the studio, but we never disturbed the complete concentration which isolated Thomas Moran from everyone he most loved—even his beloved wife, who was almost a part of himself

He was never at any time really interested in making money, and always was the worst possible salesman for his pictures; almost anyone could get a picture cheapened in price, if he would only stay long enough in the

studio, for my father was always aching to get back to work, to get to his easel, and get rid of the buyer.

He took a great joy in all beautiful artistic things; rugs, and bronzes—and he spent his money lavishly to get them. Certain things that he and my mother bought in their youth he has taken with him whenever he traveled away from home, because something in their form or beauty was necessary to him, and so appealed that he felt their need wherever he might be.

His concentration on his art, his utter lack of introspection, and his lack of interest in people as a whole, have made him personally and intimately known to very few, but his friendships have been great friendships, full of trust, and sincerity and love.

He has always been the most modest of men, but his own great sincerity of nature has given him little patience with the worldly wise, or insincere; and all his life he has been ready with lance in rest to fight to the death for any of the principles of the art that he himself has been ready to risk health, happiness, and even life itself, to attain.

So now when I look at him, in his eighty-eighth year, unchanged in spirit, still noting every variation of light and color and form in the clouds, the solidity of the foliage of the live oak, and the grace of the eucalyptus; still dreaming his fairy cities, and strange, misty mountain-rimmed seas—I feel again the old thrill and wonder of Romance, as I did in my babyhood when I crept down the stairs and into my mother's lap to watch him at work on his black and white dreams, after a long day with color—never tired, never through, always riding on through his enchanted forest.

RUTH B. MORAN.

GRAND CANYON OF ARIZONA

A characteristic scene of the Canyon, taken from the road to Hermit Trail

A GLIMPSE OF THE GRAND CANYON

Showing the wonderful coloring of the Canyon through the cedar trees of the South Rim, a view which strongly appealed to Mr. Moran.

THE BORDA GARDENS, MEXICO

With their beautiful eucalyptus trees, which make these gardens one of the interesting sights in Old Mexico

A LONG ISLAND SCENE

As a contrast to the grandiose scenery of the Great West, these quiet Long Island scenes, near his East Hampton home, were always dear to Mr. Moran.

TOWN POND, EAST HAMPTON, L. I.

The town pond is directly opposite the Moran home, and, with its old willows, it always had a quiet fascination for Mr. Moran

THE CANYON OF THE YELLOWSTONE

A favorite subject of Mr. Moran's, and one that gave him the opportunity of displaying his great knowledge of geology and his skill in composition

SUMMIT OF THE SIERRAS

From a water-color sketch

TANTALLON CASTLE

One of Mr. Moran's paintings of the castles of England, showing a fine composition, and mastery in the

AT THE WELL

One of Mr. Moran's paintings of Mexican scenes. It is interesting to note that the figures here introduced are probably the largest ever painted in a picture by him

A MEXICAN FIESTA

For a period of years Mr. Moran found the subjects for many of his paintings in Mexico. His "Mexican Fiesta" is one of his favorite paintings among his

CYPRESS POINT—MONTEREY, CALIFORNIA

The shore of California at Monterey made a strong appeal to Mr. Moran, and this is one of its most picturesque scenes

GREEN RIVER BUTTES

Here Mr. Moran for the first time saw the marvelous coloring of the Great West

GLORIOUS VENICE

Painted by Mr. Moran in 1888. when he was 51 years of age

A VENETIAN SUNSET

Painted by Mr. Moran in 1922, when he was 85 years of age

THE OWLS

One of the few night subjects painted by Mr. Moran; showing fine construction and beautiful color. Painted in 1917

MOUNT MORAN

The Teton Range in Idaho was one of Mr. Moran's early favorite sketching grounds, and in his honor the United States Geological Survey named the most majestic peak of the range. The above reproduction of his painting gives a fine idea of Mount Moran, and of the character of the scenery leading up to it

THE OSPREY FISHERMAN

BY HARRIET GEITHMANN

The American osprey is a cousin of the eagle, and, like the eagle, he "is a bird of large ideas; he embraces long distances; the continent is his home." He ranges from Alaska to the Gulf of Mexico, from Labrador to South America. He summers in the north and winters in the south. He is an internationalist; he may be found in the vicinity of salt and fresh water in almost every country on the globe.

THE OSPREY'S NEST
In Yellowstone National Park. A conspicuous basket affair made of loosely woven sticks perched at the peak of a tall pine

I remember my first introduction to the osprey. I was riding in the front seat of an omnibus in Yellowstone National Park when we passed a lone pine tree by the side of the road. On the very top was an osprey's nest, a conspicuous creation of loosely woven sticks. The driver of the bus called above the grind of the motor, "Osprey's nest." The travelers on the second seat shouted it back to the travelers on the third seat. Finally a crotchety old man on the rear seat shouted back at the driver, "Now don't try to tell me that an ostrich built his nest way up there."

A few minutes later we saw the regal owner of the lofty aerie, garbed in dusky brown, with white on his head, and a spotted vest. He must have measured two feet in length. Within a stone's throw of the Yellowstone River a colony of ospreys have built their nests on pinnacles overlooking a sublime picture of blue water, pastel-painted rocks, and evergreen trees. I watched them perch on the edge of their nests surveying the canyon from end to end. I watched them swoop down to the rushing river in search of fish.

No follower of Izaak Walton could be more patient than this aërial fisherman. Around and around he circles one hundred, two hundred feet above the water. When he spies unsuspecting prey swimming near the surface, he plunges straight as an arrow, with steady eye and unerring aim, and seizes the fish in his powerful talons. Then he shakes the water from his plumage, and with his struggling victim wings his way to a perch where he can enjoy his meal in a leisurely manner, provided always that he is not disturbed by his pirate enemy, the bald eagle. If his fish is a small one, he may consume it while on the wing. Occasionally he makes the mistake of attacking a fish too large for him to handle and finds himself unable to rise above the imprisoning water. In such circumstances he and his victim, locked in a death grasp, sink together, and their lifeless bodies are later tossed upon the beach.

The osprey usually maintains his nest as a permanent home, year after year, merely repairing each spring the ravages of winter storms. Two to four eggs are laid in May, and late in June the young ospreys arrive. Both the male and the female take part in incubating the eggs. While the young birds remain in the nest the parents are kept busy shredding fish for their hungry mouths. Later, when they urge their offspring out of the nest, they continue to feed them on the wing, and defend them against invaders until they can rustle for themselves.

THE TRAGEDY OF THE PASSENGER PIGEON

BY AGNES NIELSEN

The pages of a worn notebook bearing the date 1810 tell the story of an Ohio Valley settler who started one spring morning to drive across the prairie to a neighboring settlement. The sun was shining, no flaw marred the beauty of the day. Suddenly an immense swift-moving cloud cast its shadow across the plain, and there came a rushing wind that made the traveler's horse bolt in terror. The frightened animal ran for miles across the rutted prairie before clear sky was again overhead. The cloud that cast the alarming pall was no ordinary one of vapor. "Millions of wings, it was, that obscured the heavens, wings ranks deep and spreading column on column as far as the eye could reach. Their flapping made a noise like thunder."

THE LAST SURVIVOR OF THE RACE OF PASSENGER PIGEONS

From a photograph taken in the Cincinnati Zoölogical Park in 1912, two years before its death

The sound that deafened the prairie was the mating call of passenger pigeons flying north for the spring nesting. When the feathered hosts alighted they marked out with military precision a vast city, forty miles long and over two miles wide. The place they chose was near to a forest. Soon the forest was crowded with birds crying and jostling among the branches; every branch of every tree held a nest, and in every nest two eggs were laid. Single trees housed hundreds of nests. Strong limbs broke with the weight of the roosting birds.

About the time this entry was made in the settler's diary, J. J. Audubon, on a tour through Kentucky and the Middle West, computed the passenger pigeon population in that section at 100,000,000, besides tens of millions of the graceful slate-blue birds that nested in Pennsylvania, where all river valleys had pigeon colonies. The species, found only on the North American continent, was known from the Rockies to the Atlantic, from the Gulf of Mexico to Hudson's Bay.

A pigeon-nesting—there were two or three each year—was the signal for a general gathering of tribes. The squaws made squab butter, and stored the smoked and salted flesh of young birds for future use. The aboriginals rarely killed full-grown pigeons. It was white pioneers that inaugurated the destruction of parent birds. In many places the wild pigeons were killed off as a pest—suffocated with sulphur fumes, clubbed, trapped, shot, given to pigs to eat. Thousands of men and boys, called "pigeoners," spent their time following the flocks about, and birds were shipped by the ton from nesting regions. Live birds sold in city markets for four cents apiece. Attempts to legislate against indiscriminate killing were laughed down. People said it was ridiculous to suppose that so prolific a horde could ever be wiped out.

Finally, as a result of decades of wanton carnage, it was apparent that the pigeons were vanishing. The year 1881 saw the end of pigeon hunting as a business. Migratory flocks no longer darkened the skies, the clamor of their broods was silenced. Here and there fanciers kept a few pairs in captivity. One of a family in the Cincinnati Zoo lived for twenty-nine years, and when it died in 1914 "Finis" was written to the mournful story of the North American passenger pigeon. If you go to the museum of the Smithsonian Institution at Washington, you may pay tribute to the last of the race in a glass case, stuffed.

THE PELICAN: SYMBOL OF MOTHER LOVE

BY PAUL TEN EYCK

Pelicans are water birds, as indicated by their webbed feet and their choice of homes in tidal waters, marshes, and inland lakes. In spite of the great size of most of them and their heavy bodies, they are excellent flyers, moving rapidly, with their long necks drawn in upon the shoulders and their feet sticking out behind. They are also very good at swimming and diving, as they need to be, since their chief food is fish. The expansible pouch with which the bill is provided is, in fact, a sort of fisherman's creel—quite handy when sport is good, for large amounts of food can be collected and stored therein.

The biggest and handsomest species is the great white pelican, of which there is a colony in Yellowstone Park. This bird is as dignified and stately as a stork, and its head is adorned with a crest. Brown pelicans are much more common, and several thousand of them live on the famous Pelican Island in Indian River, Florida, a government reserve since 1903. The California brown pelican closely resembles the Florida species.

In its nesting habits and the care of its young, the pelican's ways are peculiar. The young birds when feeding insert their bills into the parent's pouch, presenting a picturesque and touching spectacle. Moreover, there is a time-honored and widespread fable to the effect that the pelican feeds its young with the blood from its own breast. The bird has thus become a symbol of self-sacrificing mother love and, by later extension, an emblem of Christian love. For this reason one finds the pelican used as a sacred device in churchly decorations. One sees it embroidered on altar cloths, for example. The writer of this article possesses a marvelously wrought antique pendant, probably made for some great ecclesiastical dignitary, whose device is the pelican feeding her brood with the drops of blood upon her bosom.

A theory as to the origin of this legend is that, in plucking the down from her breast to make a soft warm nest for her babies, the mother bird sometimes draws a drop of blood in tugging at some recalcitrant feather.

Pelicans are found in various parts of the world, not only in America, where they are fairly plentiful both in Florida and in California, but also in southeastern Europe and northeastern and southwestern Africa; and they have been reported as seen also in France, Germany, and Denmark.

Courtesy American Museum of Natural History

COLONY OF BROWN PELICANS

The brown pelican is the most common species. A colony of several thousand lives on an island in Florida. They make their nests of grass and sticks, and feed on the many schools of mullet that abound in the river

A PILGRIM AT THE HOME OF FABRE

BY L. O. HOWARD

Chief of the Bureau of Entomology, U. S. Department of Agriculture

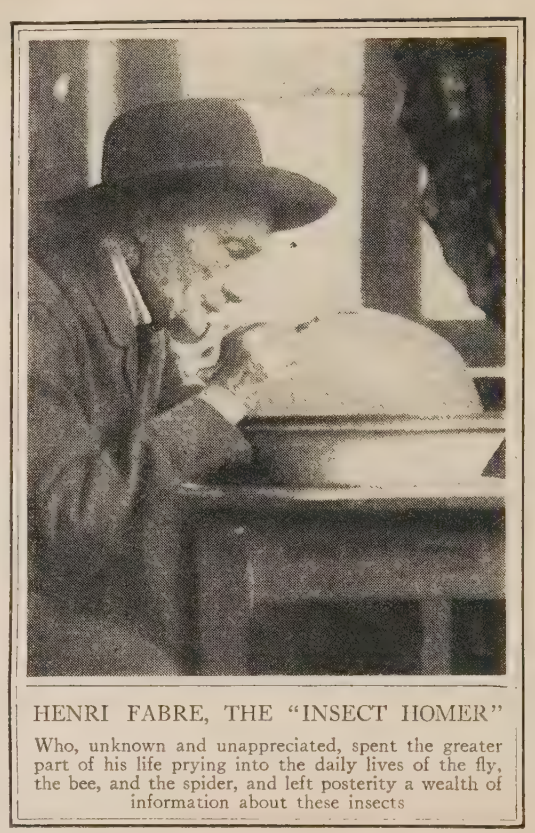
In the summer of 1920 I was in the south of France observing government methods of fighting a plague of Moroccan locusts. One night, as I sat perusing a map of the region, I discovered the obscure but—to me as a student of insects—magic name "Serignan." Serignan! That was the little town immortalized by Henri Fabre, greatest of modern French naturalists. There he had spent half his life making research and writing. There he died in 1915, at the age of ninety-two.

An American car that had seen service with the French army during the World War carried me fifty miles to the retreat that within the last few years has become a mecca for men of science and nature-loving tourists. In the general neighborhood are Tarascon and Arles and Nîmes, cities often visited by transatlantic travelers.

Bordering the home of Fabre is the "waste land," or unplanted fields, from which the modest estate took its name, "Harmas." The peasants thought this sun-scorched meadowland worthless, because no crops grew there, but Fabre found it a paradise of insects—winged creatures that swarmed unmolested and gave him illimitable opportunity for observation.

The house Fabre lived in is a square two-storied structure, painted yellow. His instruments, rather simple and crude, still lie upon the table in the up-stairs workroom. His rearing cages, which he apparently made himself, still stand in this room and along the path in front of the house. The broad range of the great man's interests is shown by the presence in his workroom of insect specimens in jars and cases, of a collection of shells, and of a well-stocked herbarium. The books in his library on the ground floor cover the field of both physical and natural science. In front of the house is an artificial rock pool, where he used to spend hours studying aquatic insects.

Arriving at the door, I was received by the daughter of the naturalist, a little bent woman, apparently in her sixties. Mademoiselle Aglae Fabre, as self-constituted custodian, has kept everything as her father would have it, and is quite accustomed to showing admirers about the place that was so bound up with his daily labors.



HENRI FABRE, THE "INSECT HOMER"

Who, unknown and unappreciated, spent the greater part of his life prying into the daily lives of the fly, the bee, and the spider, and left posterity a wealth of information about these insects

Fabre was well past middle age when he found himself in a position to devote his entire time to insect study. The property at Serignan, which he called "his Eden," was earned by long hard years of work and sacrifice as a school teacher. He was the son of poverty-stricken French peasants, and got an education under the greatest difficulties. "A good cuff when my father saw me pinning an insect to a cork was all the encouragement I received from him. And yet," he writes, "I began to observe, to inquire into things when I was still almost a baby." With an ever-watchful eye for animals and plants, the future observer, the little six-year-old monkey, practiced by himself, all unawares.

The garden at "Harmas," originally but sparsely covered with vegetation, was made into a thing of beauty by Fabre's loving hands. The luxuriant plants and trees that grow there now were nearly all introduced by him, many of them from the not far distant foothills of the Alps. The sandy soil gave him a chance to study the ways of the burrowing wasps, and the great wall around the garden became a nesting place for other insects.

Maurice Maeterlinck paid tribute to the

master in a preface to "The Life of the Spider," and it was through this contribution by the eminent author of "The Life of the Bee" that Americans first were introduced to Fabre.

It is not strange that America, the nation that brought forth, loved, and appreciated John Burroughs, should esteem the French savant. Both men had literary skill; both were keen observers; both loved nature sincerely and with understanding. To Fabre belongs the credit of founding what scientists call the "behavioristic" school. Perhaps his deductions were not always absolutely exact; in the mass of work that he accomplished flaws sometimes occurred, but for originality of theory, for ingenious experiment, for humorous, graceful, dramatic description he will always hold preëminent rank.

No other writer on topics relating to natural history has ever had the international vogue of Jean Henri Fabre. Translations of his wonderful works, and books describing his life and commenting on his achievements, are sold by increasing thousands. His writings have attracted more people to the fields of nature study than those of any other author. When he died nine years ago his name occurred on the honorary lists of more learned societies and academies than that of any other working naturalist. Yet previous to 1910 he was scarcely known outside his own circle, and there was no mention of him in leading encyclopedias.

THE HOSTESS

Aglae Fabre, daughter of the great entomologist. Her name frequently is mentioned in her father's stories

THE REWARD OF A LIFE'S WORK

"Harmas," Fabre's home in southern France, which he bought after years of hard work and self-denial. He called it an "earthly paradise," for here he could study the wasps and bees to his heart's content

"Insect Adventures," crowned by the Institute and now recognized as a classic, was begun in 1879 and finished in 1907. It comprises ten volumes, and contains all manner of fascinating tales, fancifully treated but based upon true facts in insect life. Half a century of constant study went into these narratives about bees, spiders, wasps, caterpillars, beetles, flies, grasshoppers. Fabre had passed a life of obscurity, toil, and poverty, when about twenty years ago it came to the ears of the world that the aged scientist was in actual want. The French Government granted him a pension. In his eighty-eighth year a celebration was held at Serignan, and a jubilee medal was struck in his honor. Recently the French nation bought "Harmas," to be kept in perpetuity as a memorial to the one Darwin hailed as "the incomparable observer."

BEYOND THE BOUNDS OF THE MILKY WAY

The Star Clouds of Magellan

BY HARLOW SHAPLEY
Harvard Observatory

The recent discovery that a faint nebulosity in the southern sky is in reality another immense system of stars, clusters, and nebulæ, similar to the two remote Clouds of Magellan but at a distance even greater, again attracts attention to the remarkable stellar groups that lie outside our own Galaxy of stars, at the very limits of the space reached by astronomical measuring devices.

This third cloud, which bears only the enigmatic name of N. G. C. 6822, is at the greatest distance yet measured for any stellar object, according to an estimate published at the Harvard Observatory by the present writer. Many of the globular clusters are so remote that light from them must travel in empty space for one or two thousand centuries at a speed of six trillion miles a year to reach the short-lived observer on the earth. But N. G. C. 6822 is three or four times as remote as the most distant globular cluster. Its distance, in fact, probably much exceeds two hundred and fifty kiloparsecs, and a kiloparsec is about twenty quadrillion miles, or thirty-three hundred light years.

The Magellanic Clouds have long been known and included among important astronomical objects, for they are clearly visible to the unaided eye. Their far southern declination, however, hides them below the horizon for all observers in Europe and the United States. In Bagdad, that ancient astronomical center, they could not be seen, for Bagdad is in about the same latitude as Atlanta and Los Angeles; but natives from southern Arabia reported them—at least the Large Cloud. They called it the White Ox. Marco Polo made a sketch of the Large Cloud during one of his early voyages to southern seas; but the full descriptions subsequently given by Magellan, just four hundred years ago, resulted in the permanent association of the Clouds with his name. The Latin names, "Nubecula Major" and "Nubecula Minor," are sometimes used, and it has been proposed that N. G. C. 6822 be called the third Nubecula.

In general appearance and in angular dimensions, the Magellanic Clouds resemble some of the faint stellar patches of the Milky Way. The Large Cloud would fill up the bowl of the Big Dipper, if its shape were changed from circular to oblong. The Small Cloud covers about one fourth as much area as the Large. Both contain hundreds of thousands of stars, and mixed in with these stars of many types are numerous nebulæ of various shapes and sizes. The spectroscope shows that most of the nebulæ in the clouds are gaseous—they shine by means of their hydrogen, helium, and nebulium gases.

THE DIFFUSE NEBULA

Eta Carinæ, one of the most beautiful nebulæ of the Southern Milky Way. It is not in the clouds but in our own Milky Way

Among the bright stars in both Clouds, hundreds of variables have been discovered with the aid of Harvard photographs. These variable stars oscillate in light intensity in regular periods, and are called Cepheids, after the bright northern star Delta Cephei, which varies in similar manner. The study of the light variations has led to the discovery that the interval between successive maxima in brightness of a Cepheid variable is a measure of its absolute candle power. By knowing the candle power, it is then a simple matter for astronomers to compute the distance of the variable star and of the whole star cloud of which it is a member. From investigations of the magnitudes and periods of the variable stars, the distance of the Small Magellanic Cloud is now placed at twenty-five kiloparsecs, and the Large

Cloud at thirty-five kiloparsecs. At such distance, dwarf stars like the sun would be far beyond present telescopic power.

With distances known, several interesting deductions can be made at once concerning these remote Clouds of Magellan. They are quite clear of our watch-shaped stellar organization called the "Galactic System." The distance across the Small Cloud is about five thousand light years, and across the Large Cloud three times as great. (The distance from the earth to the Orion Nebula is six hundred light years.) The brightest stars of the Magellanic Clouds are great giants, many of them exceeding Betelgeuse in diameter; and of course every one of those so far photographed, in either Cloud, much excels our sun in dimensions and brightness.

Measures of the motions of the Magellanic Clouds, by astronomers at the Lick Observatory's station at Santiago, Chile, show that the Large Cloud recedes with a speed of one hundred and sixty miles a second. The Small Cloud moves away more slowly—about one hundred miles a second. If these velocities have been maintained throughout the geological past, the Magellanic Clouds must have been inside our Milky Way during the age of reptiles in Mesozoic times. This thought leads us to wonder if all our Milky Way Clouds are permanent captives in the Galactic system.

In many respects the "third Nubecula" resembles the Magellanic Clouds. Several variable stars have been found within it. Its brighter nebulæ appear to be gaseous. Its brighter stars appear to be reddish supergiants. Though visible to a trained eye in a medium-sized telescope, it is photographed only with difficulty, and special effort is required to resolve the background of nebulosity into its thousands of individual stars. In angular dimensions the object is scarcely one sixth as large as the moon.

N. G. C. 6822 is in the constellation of Sagittarius, only fifteen degrees south of the celestial equator. It was first seen by an amateur astronomer at Nashville, Tennessee, about forty years ago. He was observing with a six-inch telescope of ordinary make, and little did he realize that the nebulosity described by him as "very faint, large, elongated, diffuse" would turn out to be a cloud containing the most distant of all known stars. That keen-eyed amateur, it should be remarked, soon became the world-famous discoverer and observer of comets, planets, and nebulæ—Professor Edward E. Barnard of the Yerkes Observatory, whose contributions to observational astronomy have no equal in the science. His early discoveries in Tennessee were communicated to an Irish observatory, to the compiler of a great catalogue of clusters and nebulæ, and the newly found objects were assigned numbers depending on their positions in the sky.

There are some faint globular clusters at distances between 100,000 and 200,000 light years; and the greatest diameter of our own Galaxy has been estimated at 300,000 light years. But this new cloud, which first impressed itself upon human vision through the telescope of an enthusiastic amateur, seems to lie at a distance of about a million light years and to be quite clear of our Galactic System. It is a "universe" on its own account, much more isolated than the Magellanic Clouds, and probably destined always to remain free from the great organization of which we form a part.

THE GREAT MAGELLANIC CLOUD — Its distance is more than a hundred thousand light years. One quarter of the stars in the picture are between us and the distant star cloud

MONUMENT TO SEA GULLS

BY E. M. DOLE

To Audubon, to John Burroughs, to W. H. Hudson memorials of stone have been raised commemorating their devotion to the songsters of three continents. In a western American city there stands a statue erected in grateful memory of a blessing conferred by birds upon man.

The monument referred to is one of the chief sculptural adornments of the City of Salt Lake. A granite shaft fifteen feet high bears aloft a globe that offers a perch for two gilded sea gulls. In the large pool, at the base, birds come to drink and bathe. Four bronze plaques mounted on the pedestal of the column record the story of the miraculous delivery of early settlers from a swarm of crickets that had attacked their fields and threatened starvation.

The Sea Gulls' Monument was designed by Mahonri Young, a grandson of Brigham Young and a sculptor of distinction. Forty thousand dollars was contributed toward the erection of this thank offering to gulls that flocked from the borders of Salt Lake to the aid of Utah pioneers in the year 1848. The unveiling, eleven years ago, was witnessed by a dozen men and women that took part in "the cricket war" and profited by the coming of the gulls. They recalled the plight of the settlers who twice planted their fields only to see the ripening harvest ravished by marauding insects. "Black crickets came down by millions and destroyed our grain crops; fields of wheat, promising in the morning, were by evening as smooth as a man's hand, devoured by the crickets. At this juncture sea gulls came by hundreds and thousands; before the crops were entirely destroyed they devoured the insects, so that our fields were entirely free from them. The settlers at Salt Lake regarded the advent of the birds as heaven-sent."

THE SEA GULLS' MONUMENT
SALT LAKE CITY, UTAH

Bas-relief from pedestal of monument

THE PIONEERS GIVE THANKS
For the coming of the gulls

"I am relating what I saw," another testified. "Whenever the gulls had been filled to capacity they would fly to the banks of the creek and there disgorge the dead pests, which lay in piles that literally covered the banks of the creek. The birds became so tame that they followed our wagons as we drove into our dooryards. With the help of the Lord we were able that fall to reap a good harvest."

Many times birds have come to the rescue of farmers persecuted by plagues of insects; but the Sea Gulls' Monument is the first enduring memorial to be raised in token of such service.

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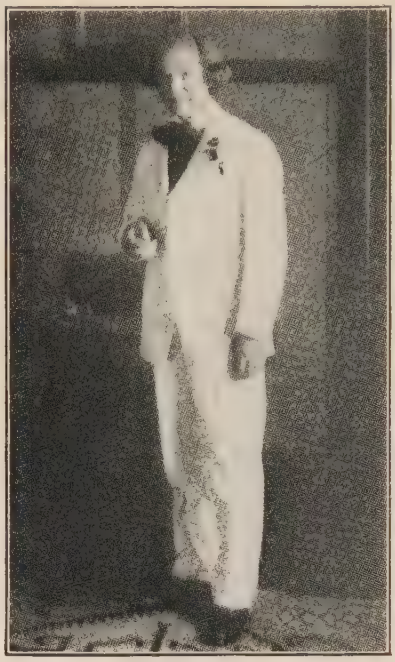
"HE IS GREAT who inspires others to think for themselves.

"HE IS GREAT who pulls you out of your mental ruts, lifts you out of the mire of the commonplace, whom you alternately love and hate, but whom you cannot forget.

"HE IS GREAT to whom writers, poets, painters, philosophers, preachers, and scientists go, each to fill his own little tin cup, dipper, calabash, vase, stein, pitcher, amphora, bucket, tub, barrel or cask."

—From Hubbard's Little Journey on Jean Jacques Rousseau.



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THOMAS EDISON—"Elbert Hubbard has been of big service to me in telling me the things I knew, but which I did not know I knew until he told me."

ROBERT L. OWEN—"Elbert Hubbard took some of the cobwebs out of my brain and I learned from him some of the wisdom of simple living."

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THE RAREST GEM OF THE OCEAN

BY MAY TEVIS

In the great entrance hall of the American Museum of Natural History, New York, along with immense meteors fallen from the sky, there is a glass case containing a precious but tiny object from the bottom of the sea that for rarity surpasses all others of its kind. Few of the hundreds that daily pass have any conception of the value of this lovely bauble from Neptune's jewel chest, the "Glory of the Sea."

For centuries sea shells have been among the objects nearest to the heart of the collector. Infinite diversity in their form and color makes an unfailing appeal to the lover of nature's beauties. Moreover, they breathe the mystery and romance of their origin, bringing now a thought of the coral reefs of the tropics, and now a vision of the sterner coast of the northland.

Among the shells most sought are those belonging to the branch of the mollusc family called cones. These shells of exquisite shape and decoration are widely distributed in tropical seas, but are more often found in the Indian and Pacific oceans. All are fashioned with a delicately wrought conical spiral at the tip. In color they are varied and striking. The Glory of the Sea, now extinct, is the most highly prized of all. Three specimens are owned in America, and nine or ten others are known to exist elsewhere. The one recently acquired by the American Museum, because of its "unusually slender and graceful proportions and tapering spire, suggests an unfolding rosebud." The simile is the more apt because of the lovely color scheme. The ivory background is touched with delicate rose and overlaid with a rich spiral ribbon of orange. The surface is furthermore covered with a marvelous lacelike fretwork composed of minute triangles ranging from chrome yellow to chestnut brown. At a little distance one gets the impression of the rich tinting of a tea rose.

The Glory of the Sea first became known to collectors about the middle of the eighteenth century, and at once agents throughout the world were on watch for it. It is related that a Dutch connoisseur who owned a perfect specimen, on learning that a second was to be sold, hastened to the auction-room, outbid all competitors, then ground the fragile thing beneath his heel, exclaiming in triumph, "Now my own treasure is alone in its glory."

The famous British conchologist, Hugh Cuming, had the amazing piece of luck to find three living specimens on a coral reef in the Philippines—one adult and two small ones. "I almost fainted with joy," he declared. Strange to say only a few weeks later an earthquake and tidal wave wiped out this reef, so that the intrinsic value of his find was augmented by the accidental increase in rarity.

Cones in general are highly aggressive creatures, making war upon other kinds of molluscs, whose shells they drill in order to feed upon the defenseless animals within.

Courtesy American Museum of Natural History

ONLY A DOZEN OF THESE IN THE WORLD

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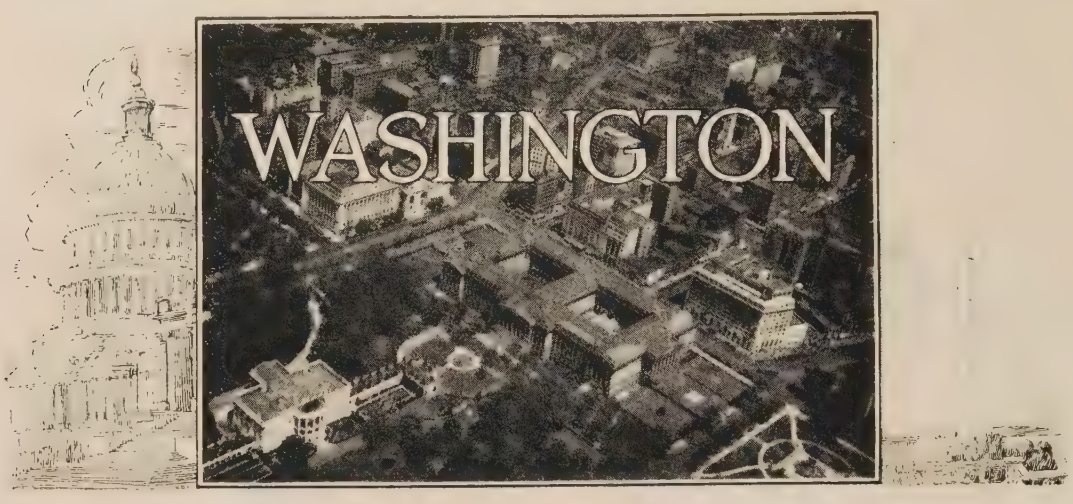

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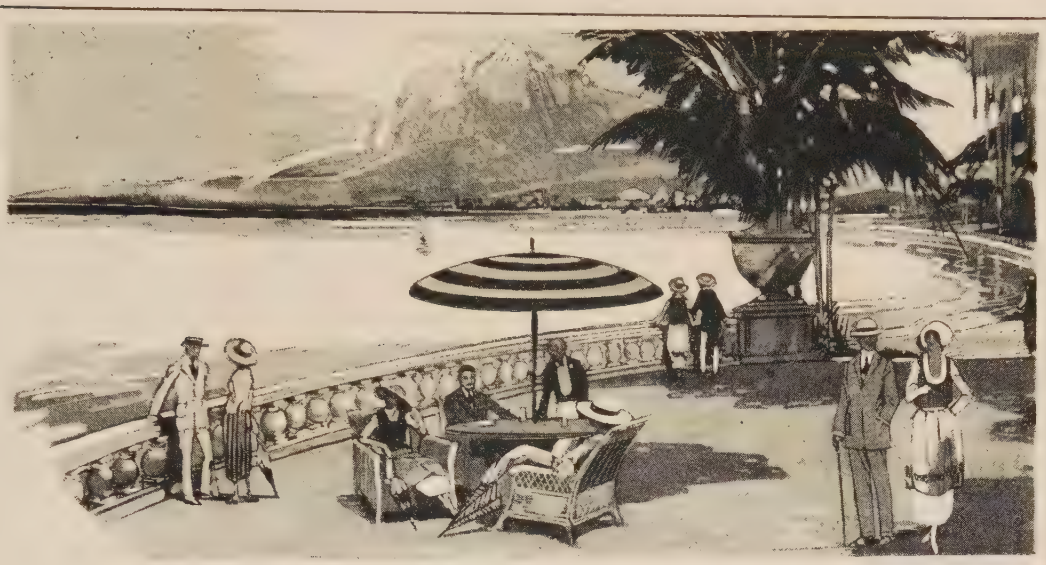

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Why treat your mind like a merry-go-round?

A HARD-WORKING merry-go-round travels as far in a year as a transcontinental express. But it gets nowhere.

Most men and women treat their minds like merry-go-rounds. They read enough, goodness knows, but at the end of the year they have learned nothing, made no mental growth, arrived nowhere.

Said Hamilton Wright Mabie:

"Many people expend in desultory reading time and effort that, wisely directed, would make them masters of epochs and literatures. The art of reading is to read in such a way that with the utmost economy of time one can secure the richest results."

"Fair enough," you say, "but who is going to teach me this 'art of reading'? Among so many million books how can I know which are really worth while?"

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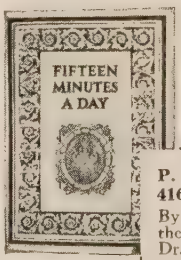

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MANY persons say, "Did you hear from him to-day?" They should say, "Have you heard from him to-day?" Some persons spell calendar "*calender*" or "*calander*." Still others say "between you and I" instead of "between you and me." It is astonishing how many persons use "who" for "whom" and mispronounce the simplest words. Few know whether to spell certain words with one or two "c's" or "m's" or "r's," or with "ie" or "ei," and when to use commas in order to make their meaning absolutely clear. Most persons use only common words—colorless, flat, ordinary. Their speech and their letters are lifeless, monotonous, humdrum. Every time they talk or write they show themselves lacking in the essential points of English.

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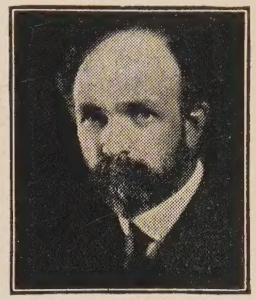

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THE OPEN LETTER

THE Elephant Number of The Mentor has brought us many enthusiastic letters from readers—and also a number of questions concerning the traits and behavior of the elephant. We referred these questions to Mr. Charles Mayer, the author of one of the articles in our Elephant Number. Mr. Mayer has for years been a professional collector of wild animals; and no man living to-day knows more about the character and habits of the elephant than he.

Mr. Mayer was in the editorial office of The Mentor a short time ago and gave us the following answers:

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Q. *How long do elephants live?*

A. Under good conditions elephants live to the age of one hundred and fifty years.

Q. *What are some of their daily habits?*

A. When young they play like young bears and other animals. When full grown they travel in herds through jungle and meadow in search of food and drink, keeping in mind always their favorite water hole. They eat shoots of bamboo trees, barks of certain trees, and the branches of the cocoanut.

Q. *How do they express their feelings?*

A. They have various sounds for anger, fury, and pleasure. When rushing on an enemy they trumpet shrilly with the trunk. Anger is shown by a low hoarse grumble from the throat. In trying to intimidate an enemy they strike their trunks to the ground, at the same moment emitting a sound like that of rattling a sheet of tin. Pleasure is always expressed by a continued little squeaking through the trunk.

Q. *What is the relation of an elephant to its mate?*

A. The female elephant, like the female emu bird, is "emancipated." The female elephant chooses and seeks its own mate, and the domestic life is according to female direction. The elephant breeds from fifteen years up, and until it is seventy-five years old. The elephant breeds every two and one-half to three years. A fact of unique interest is that a baby elephant born at eighteen months is always a female—when born at twenty-one months it is a male. Very rarely are twins born to elephants. A baby elephant at time of birth will weigh about two hundred pounds. The baby elephant, unlike other animals, is born in possession of its full faculties. Its experience, therefore, is not in acquiring use of faculties, but in learning to exercise them. It simply has to be "shown around" by its mother. It grows steadily through the years until it attains its full height at the age of twenty-five.

Q. *Is it true that their memory is phenomenal?*

A. Many stories have been told about the wonderful memory of an elephant. My experience convinces me that the elephant, in training at least, has no special memory. In the native state they are quite stupid and show no originality or discernment or retentive faculties. When they have been trained and taught anything it becomes a habit, and they go through a trick or act at a mere sign from their trainer. They are extraordinarily intelligent in grasping an idea when it is given to them. There seems to be almost no limit to the things that elephants can be taught. They are infinitely patient and apparently willing to learn. They take a genuine interest in a new trick, and at times, under training, when an elephant is tied up, one will find him practicing his little "stunt" all alone.

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Rarely have we published a number of The Mentor that has brought forth as many eager questions as the Elephant Number. It is evident that the elephant has plenty of interested human friends.

W. D. Moffat
• Editor

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